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Drake et al.

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(45) **Date of Patent: Jun. 2, 2015**

(54) **RACK SYSTEM AND BRACKET**

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(73) Assignee: **SOLID RACKS PTY LIMITED**, Brookvale (AU)

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(2), (4) Date: **Nov. 15, 2012**

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(51) **Int. Cl.**
A47F 5/08 (2006.01)
A47H 1/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC . ***A47B 96/06*** (2013.01); ***A47F 5/08*** (2013.01); ***A47F 5/0823*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A47F 5/0823; A47F 5/0876; A47F 5/08; A47F 5/0807; A47F 5/0815; A47F 5/083; A47F 5/0884; A47F 5/103; A47F 5/101; A47F 5/0068; A47F 7/143; A47B 96/067; A47B 96/061; A47B 96/14; A47B 96/1408; A47B 96/1458; A47B 96/1475; A47B 96/068; A47B 96/06; A47B 2096/1491; A47B 95/008; A47B 57/40; A47B 57/32; A47B 57/30; A47B 57/42; A47B 57/52; A47B 57/56; A47B 57/562; A47B 57/46; A47B 57/045; A47B 57/34; A47B 57/485; A47B 47/022; F16B 21/09
USPC 211/13.1, 85.7, 18, 70.6, 60.1, 103, 211/187, 190, 193, 57.1, 59.1, 87.01; 248/220.31, 220.41, 220.42, 220.43, 248/221.12, 223.21, 225.11
See application file for complete search history.

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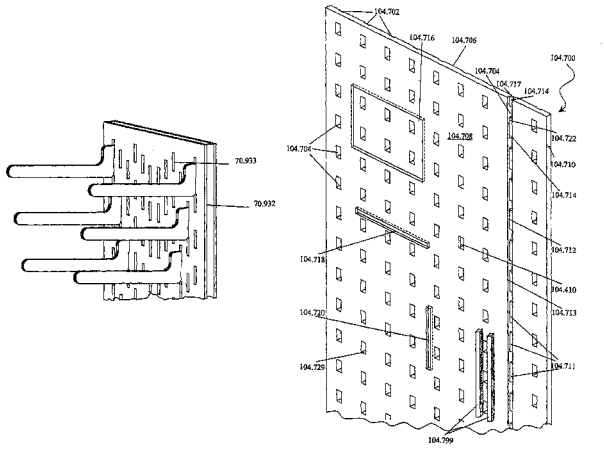
Primary Examiner — Jennifer E Novosad
(74) *Attorney, Agent, or Firm* — Gordon & Jacobson, PC

(57) **ABSTRACT**

A bracket or support member (**119.771**) including a body (**119.770**), at least one arm or hook extending away from the body that can be inserted through an aperture (**104.704**) in a support (**104.700**), the at least one arm or hook (**119.722**) including an end portion (**119.720**) which is adapted to be received into a recess (**104.702**) on a rear surface of the support (**104.700**). A support system (FIG. **124**) is also disclosed which utilizes the bracket or support member (**119.771**) in combination with an apertured panel (**124.700**).

25 Claims, 67 Drawing Sheets



(51) **Int. Cl.**

A47B 96/06	(2006.01)
A47B 57/34	(2006.01)
A47B 57/48	(2006.01)
A47B 96/14	(2006.01)

(52) **U.S. Cl.**

CPC ***A47F 5/0884*** (2013.01); ***A47B 57/34*** (2013.01); *A47B 57/485* (2013.01); *A47B 96/061* (2013.01); *A47B 2096/1491* (2013.01)

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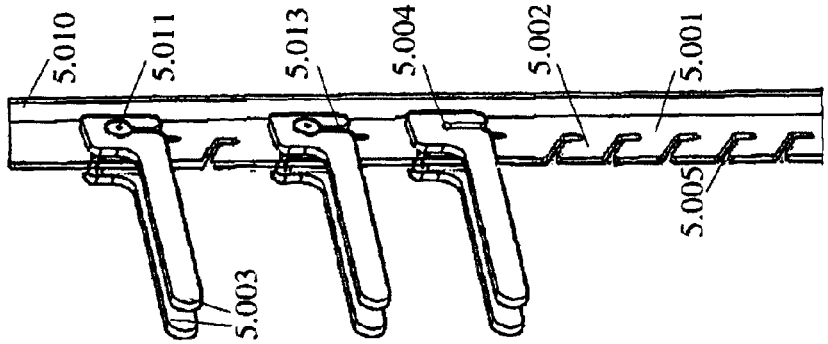

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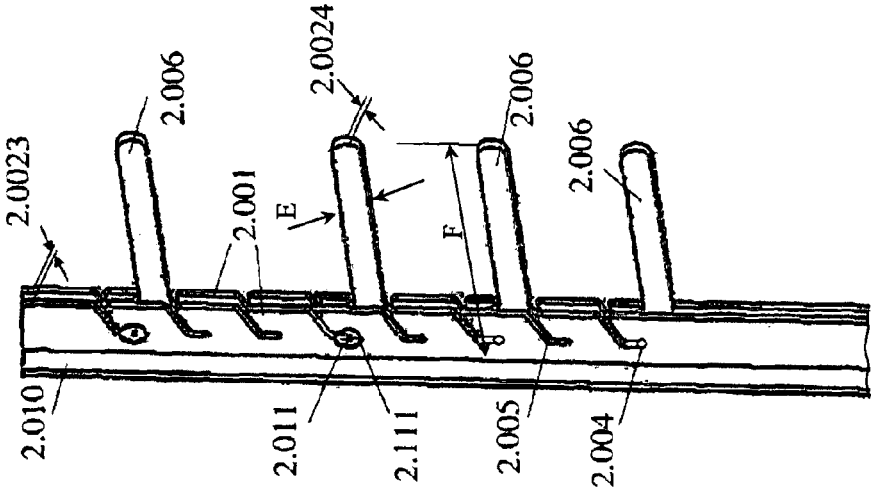

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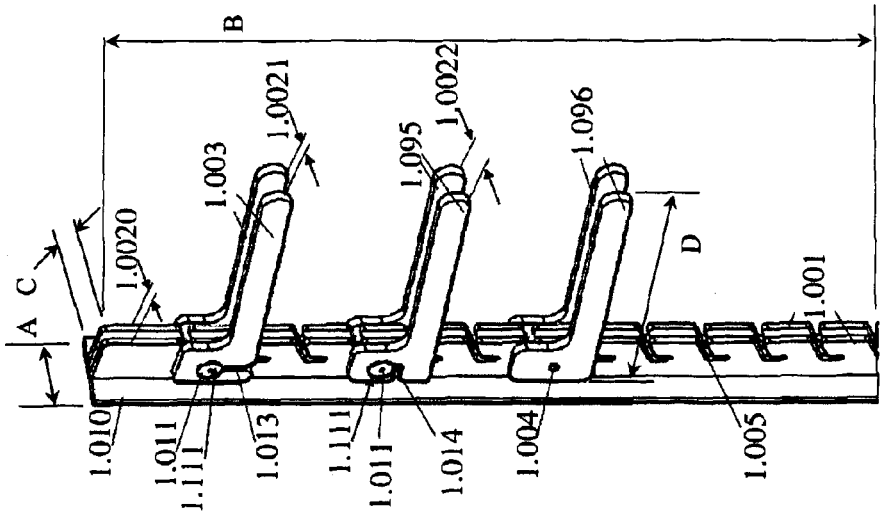

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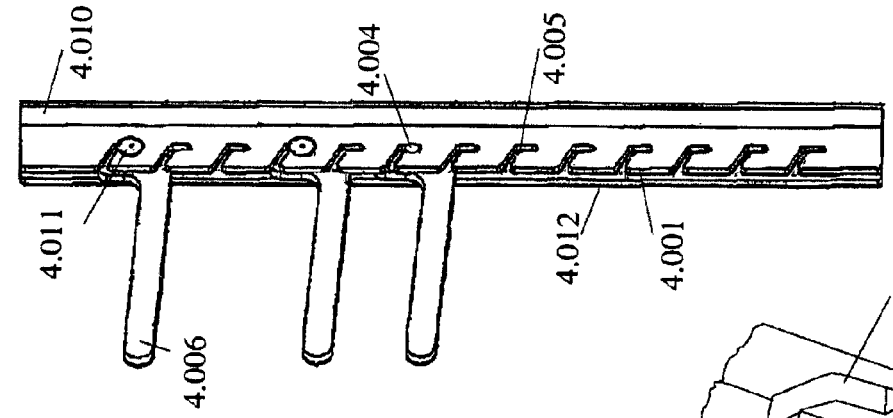

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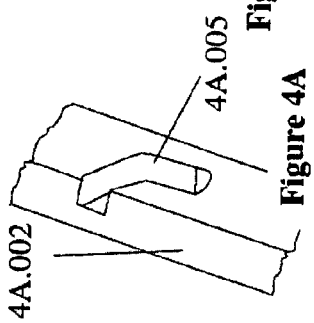

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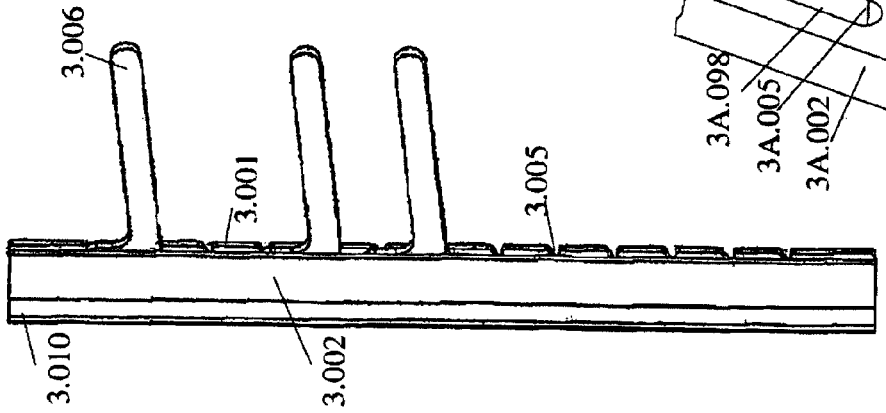

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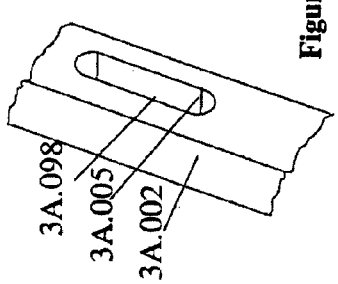

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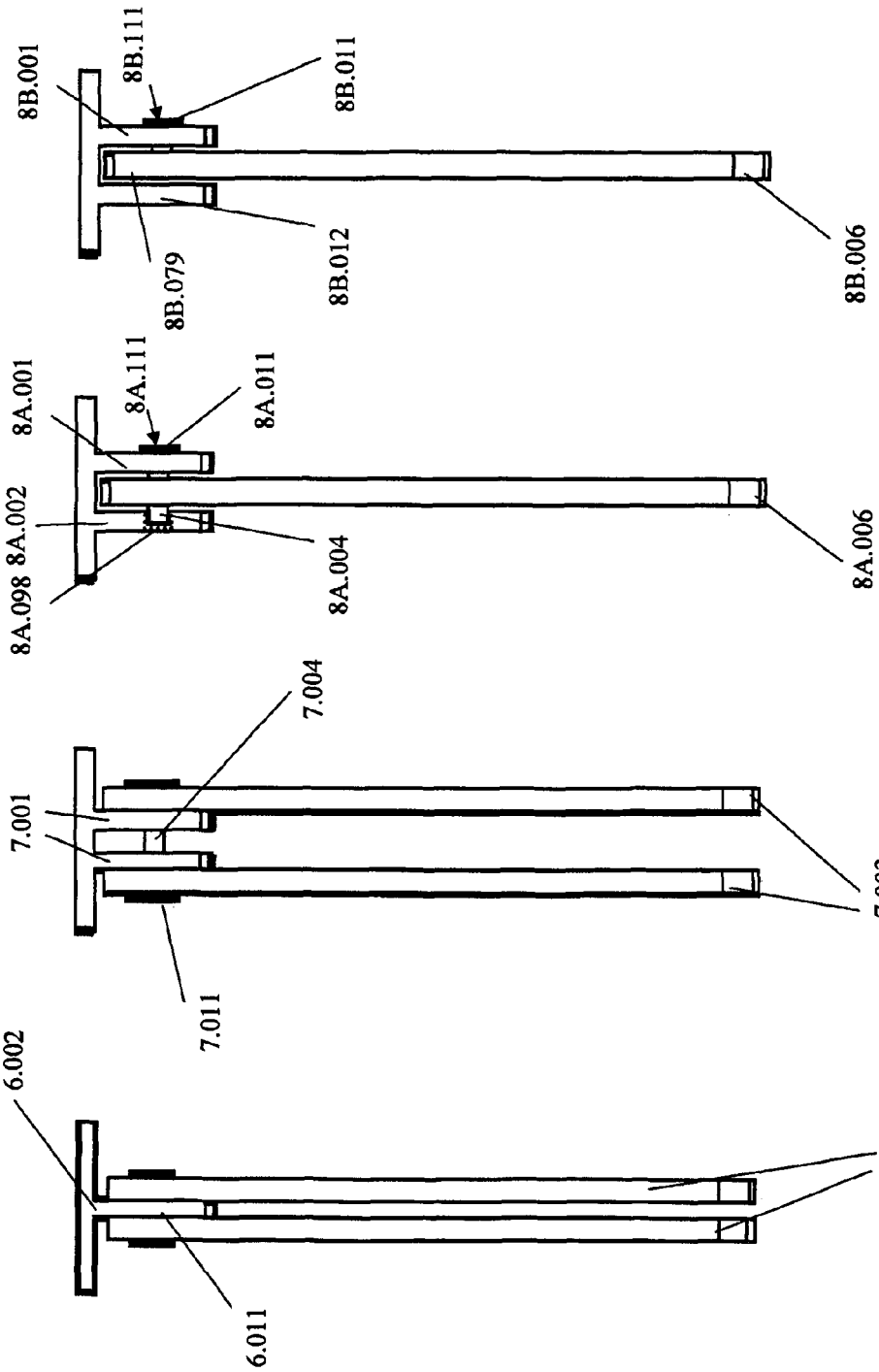

Figure 8b

Figure 8a

Figure 7

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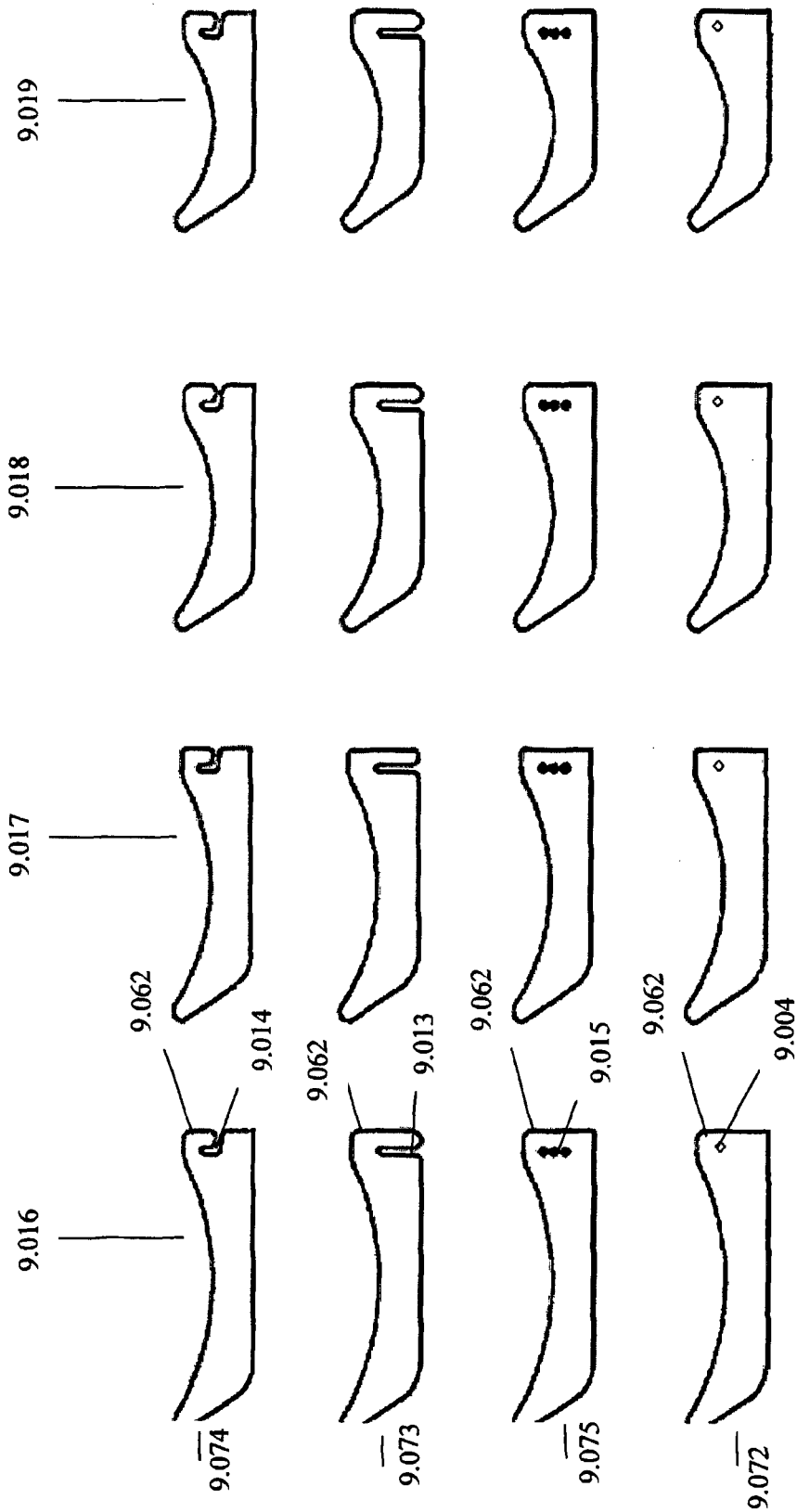
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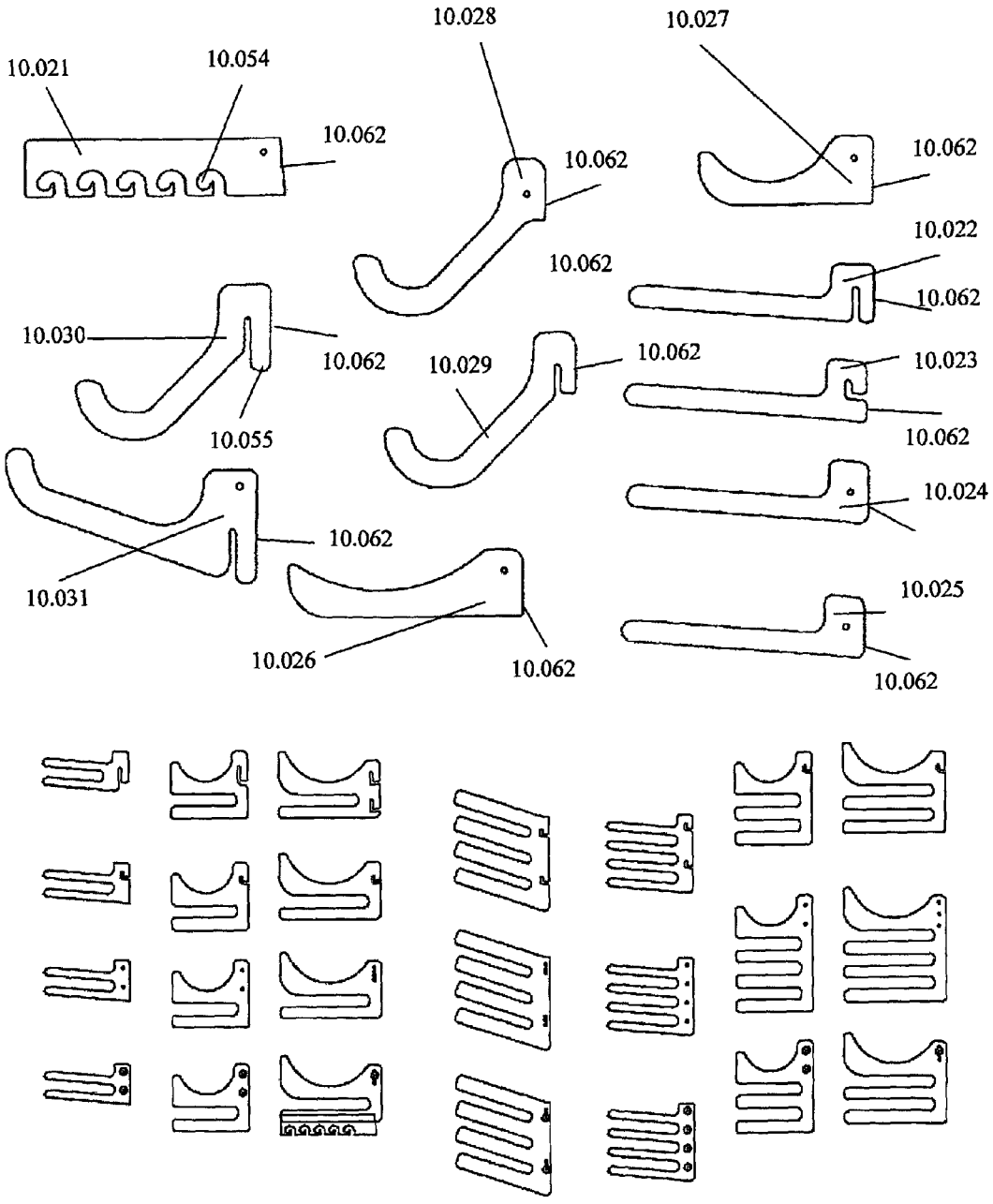
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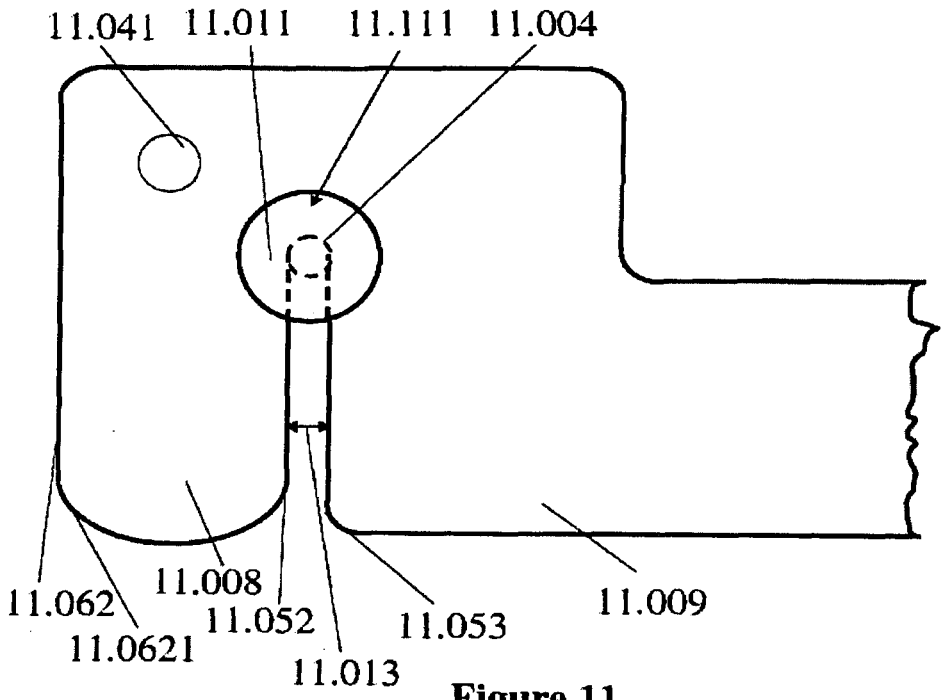

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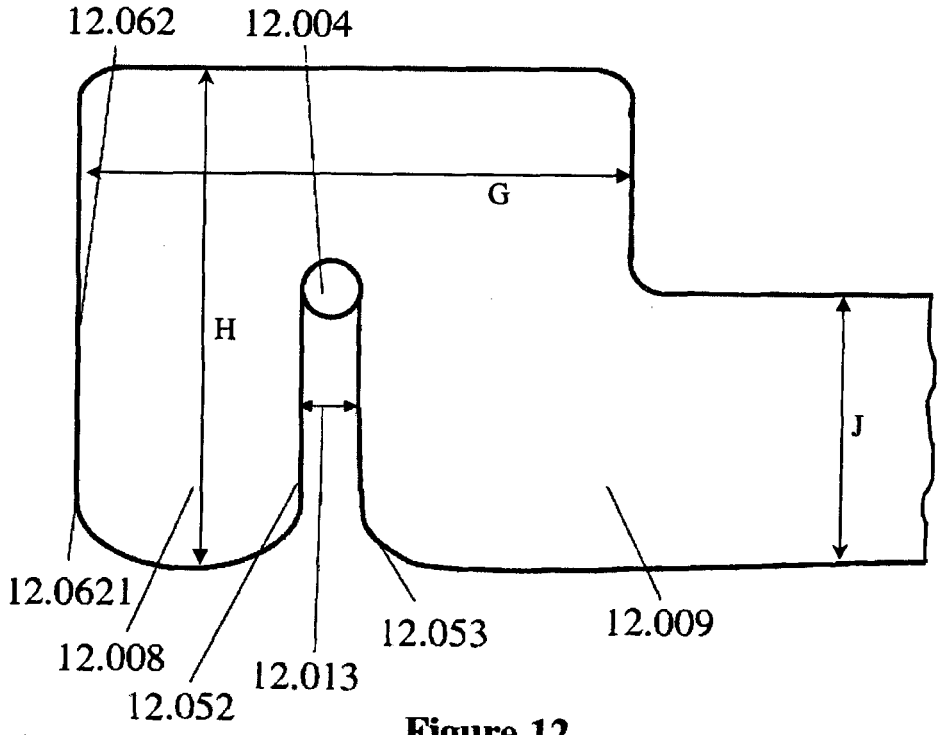

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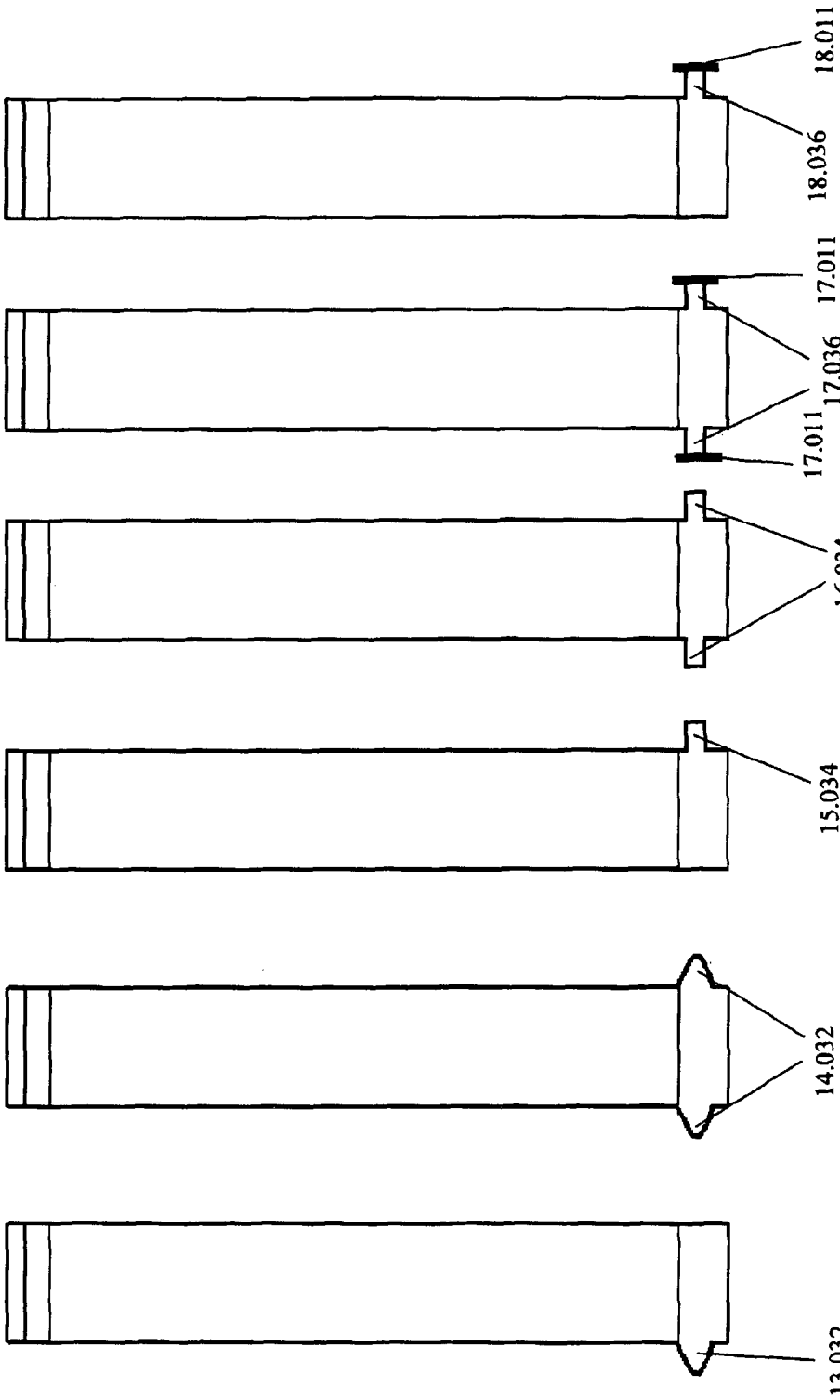
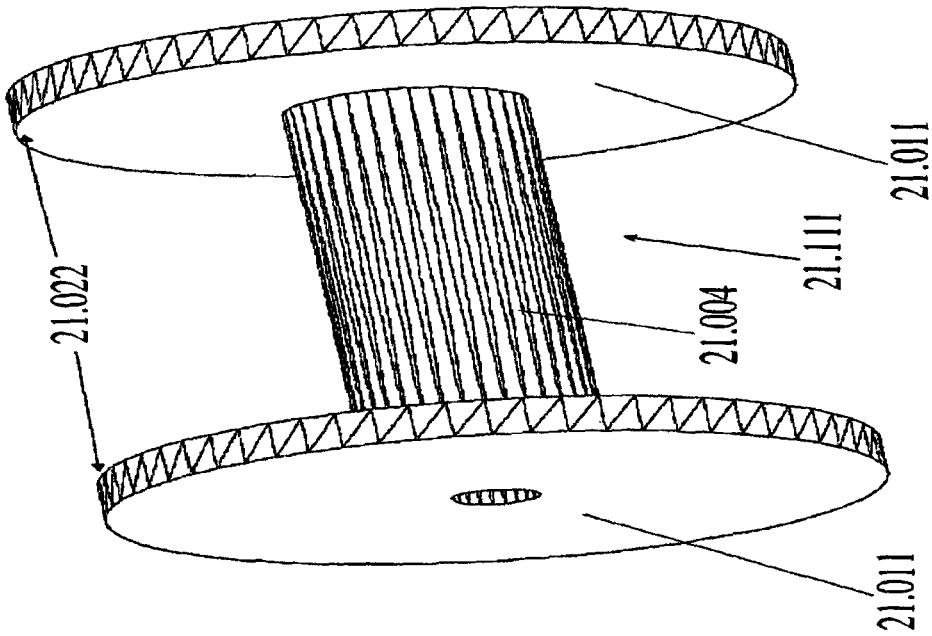


Figure 18 Figure 17 Figure 16 Figure 15 Figure 14 Figure 13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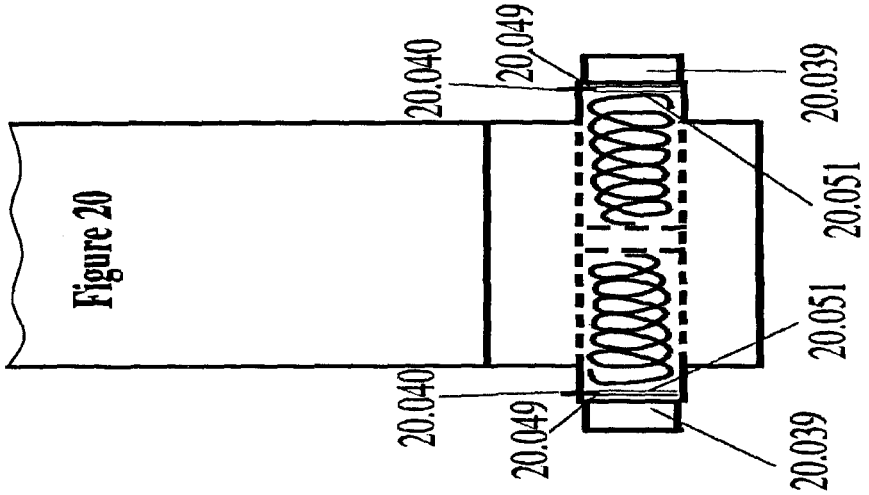
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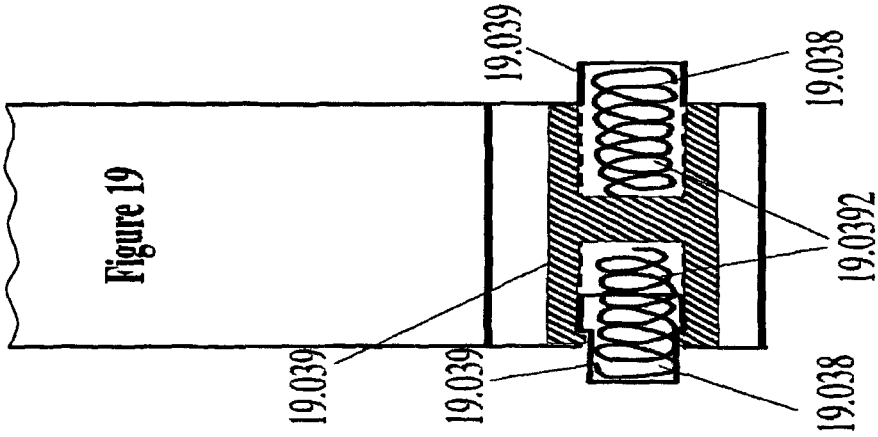
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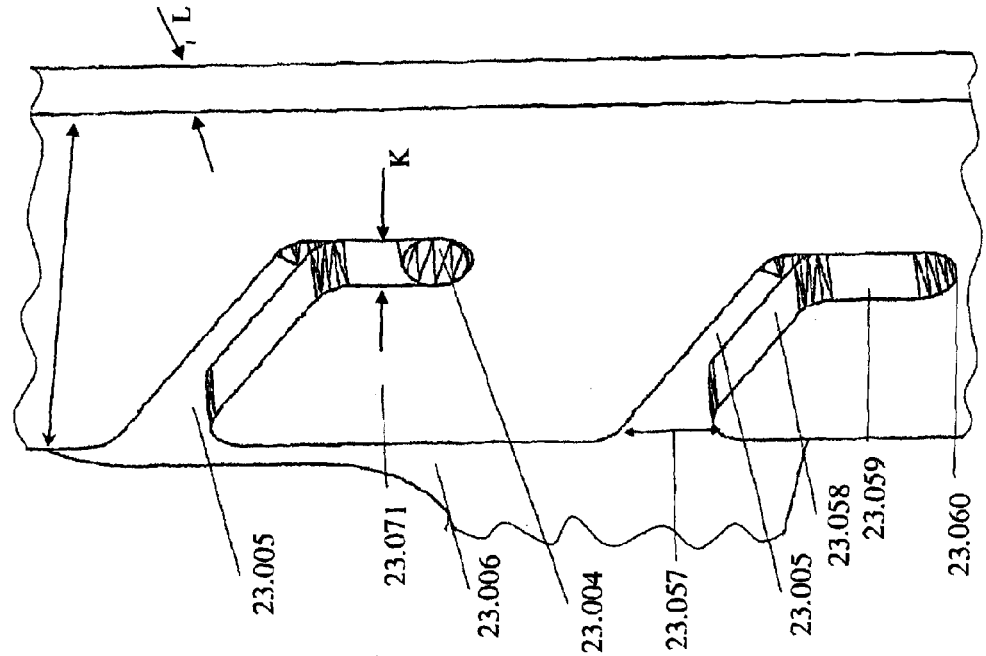

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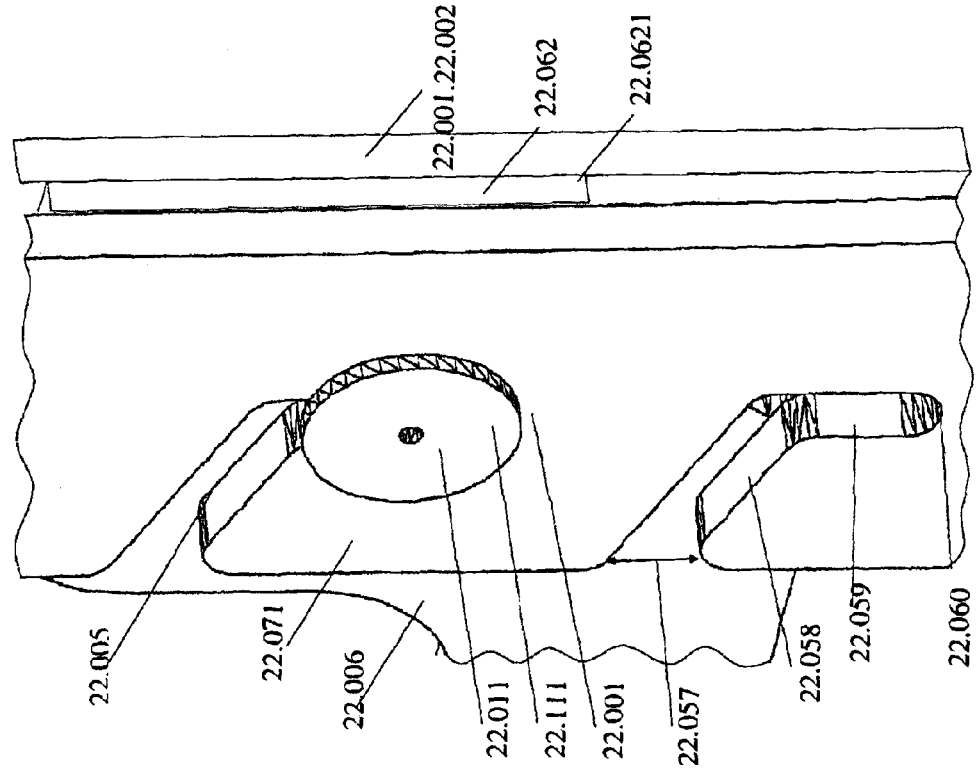

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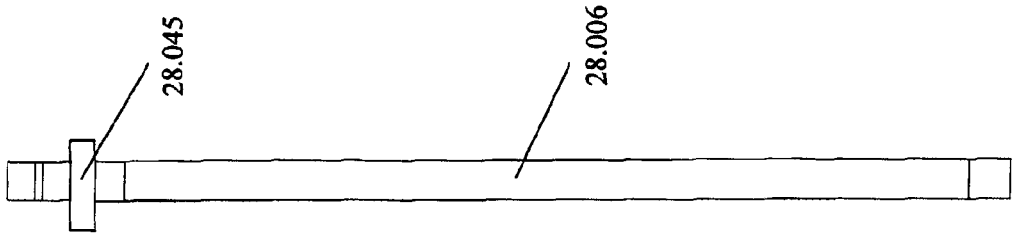

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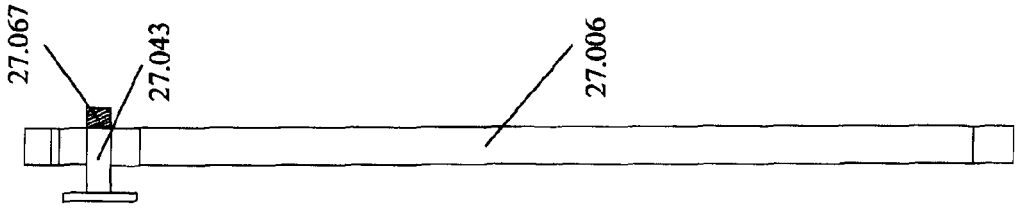

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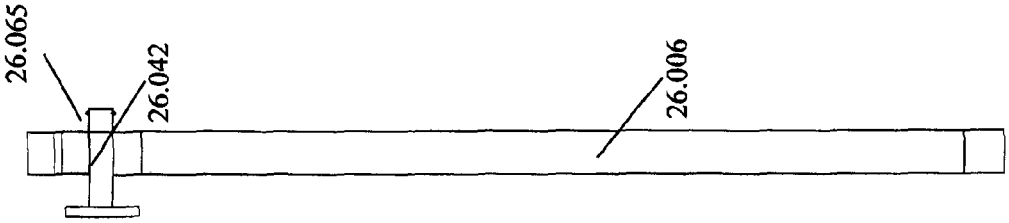

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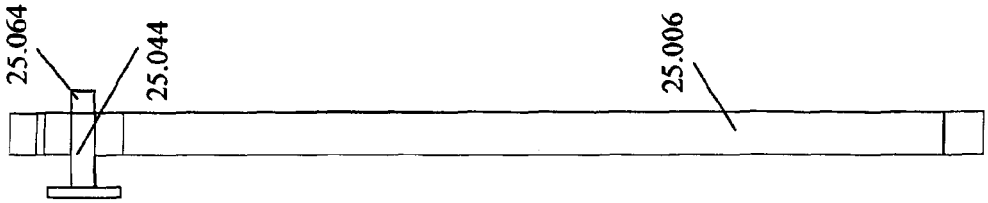

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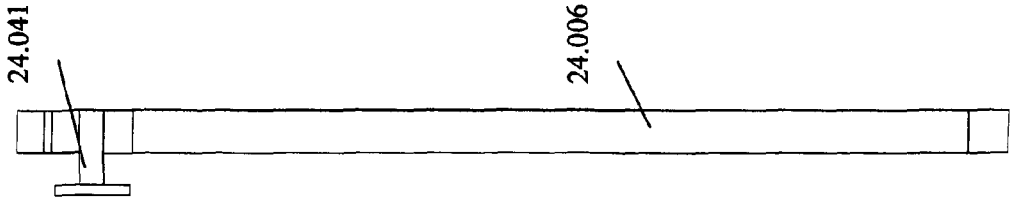

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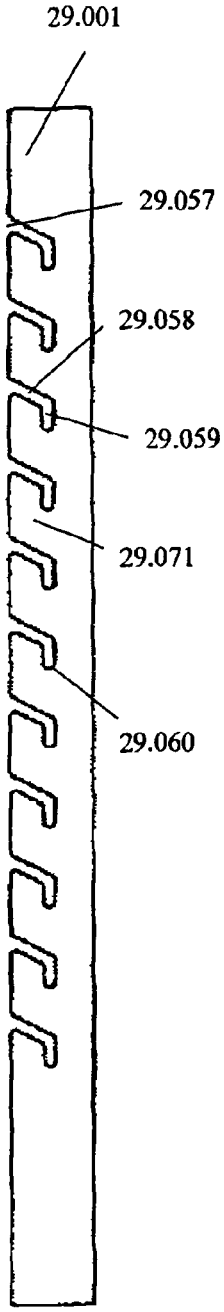

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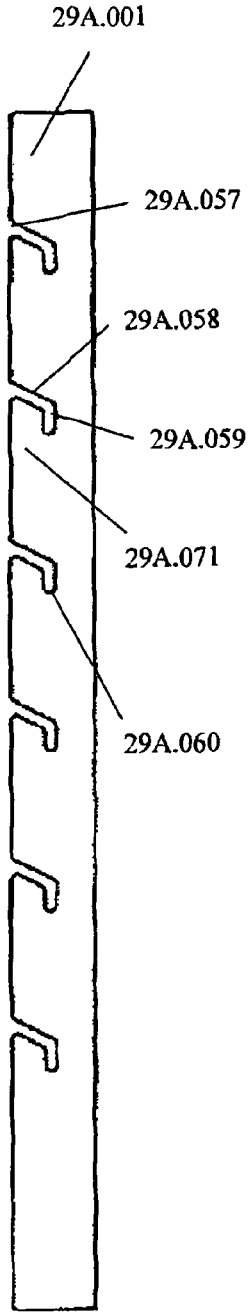

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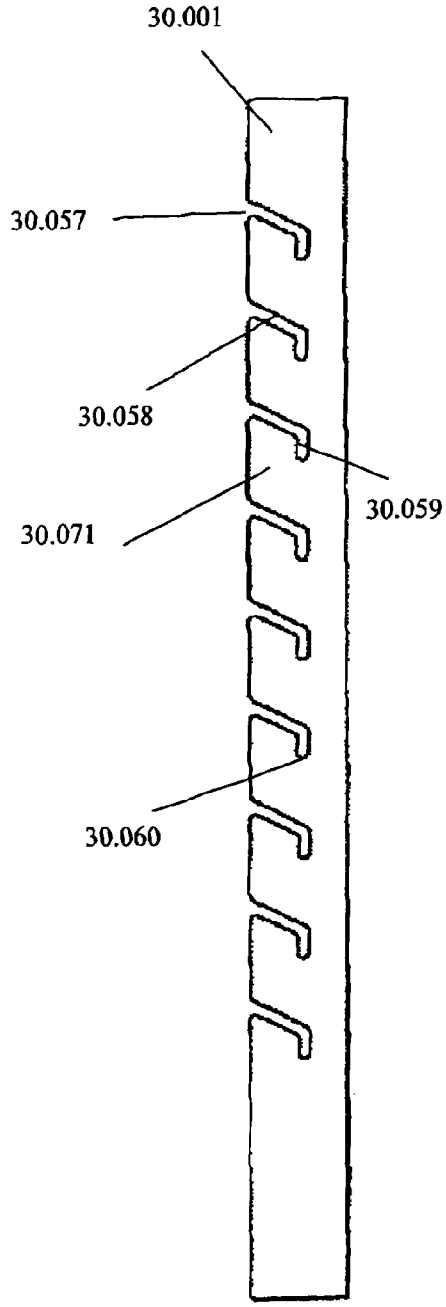

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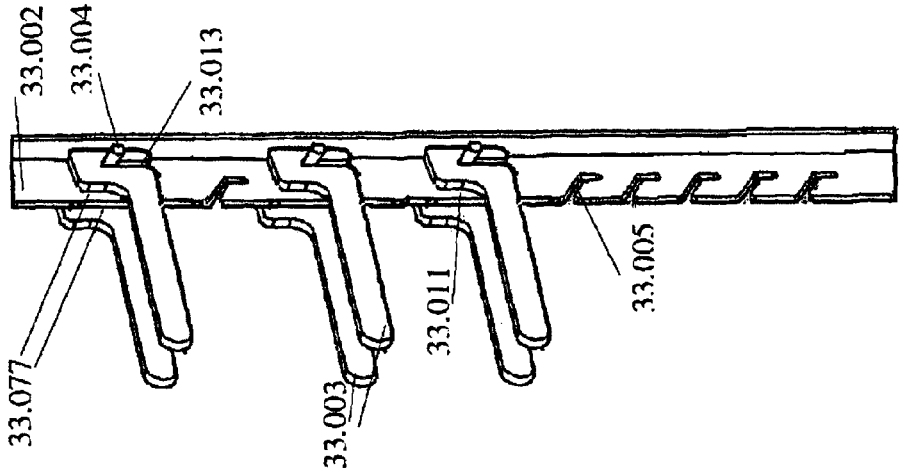

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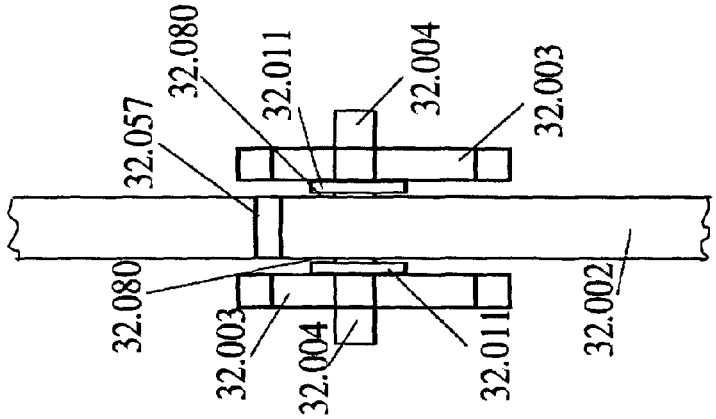

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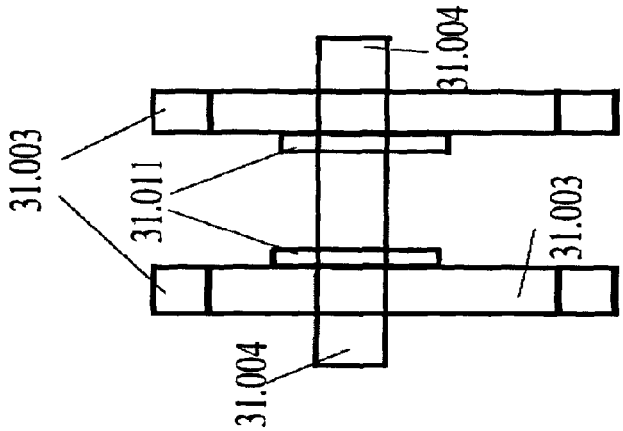

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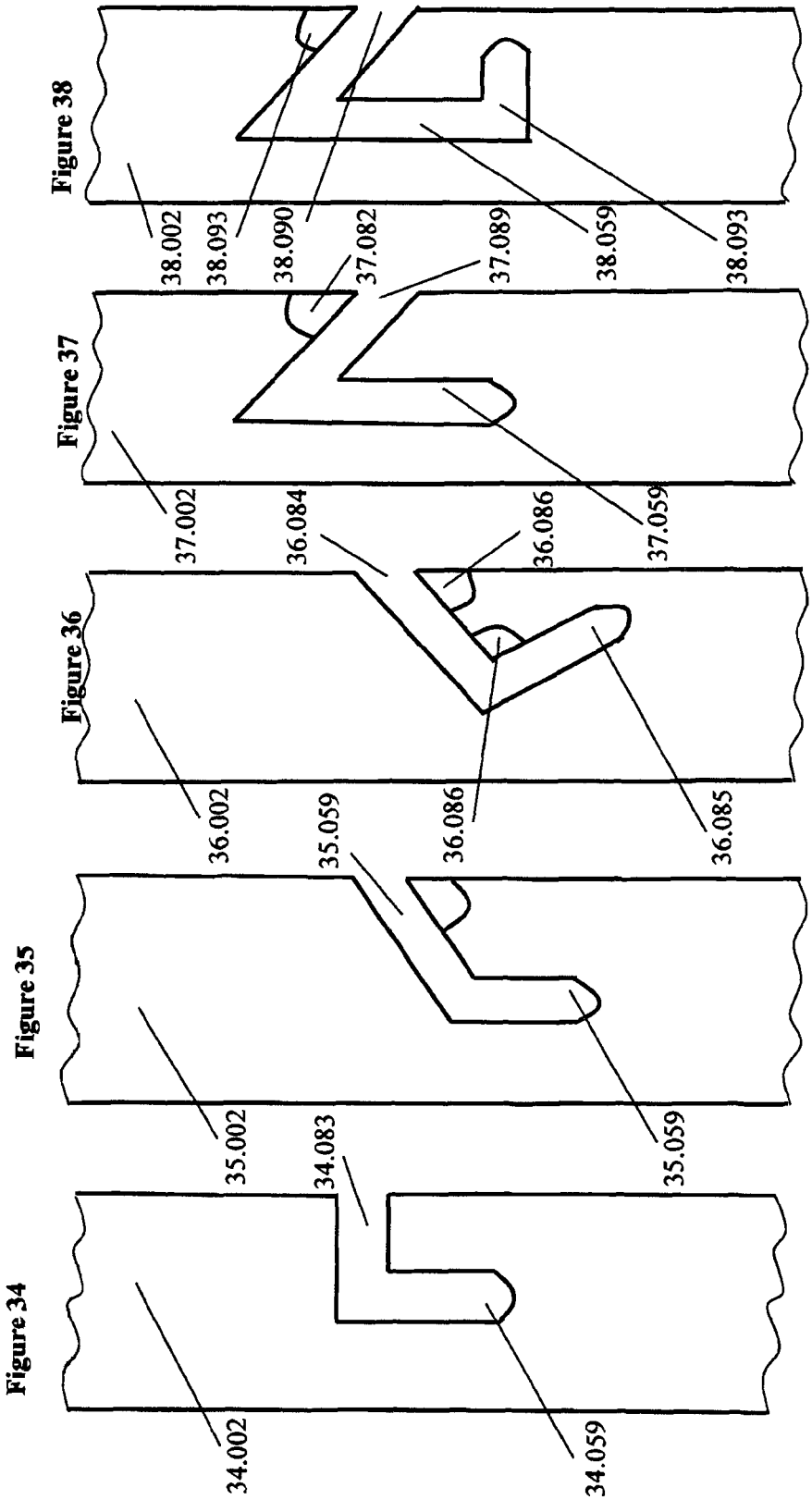
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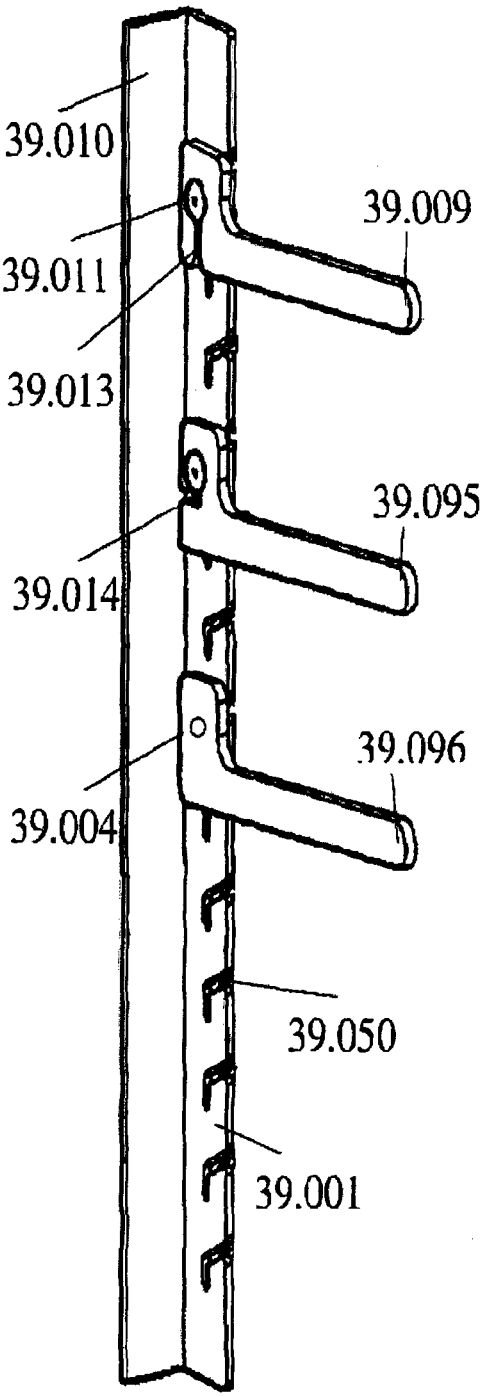

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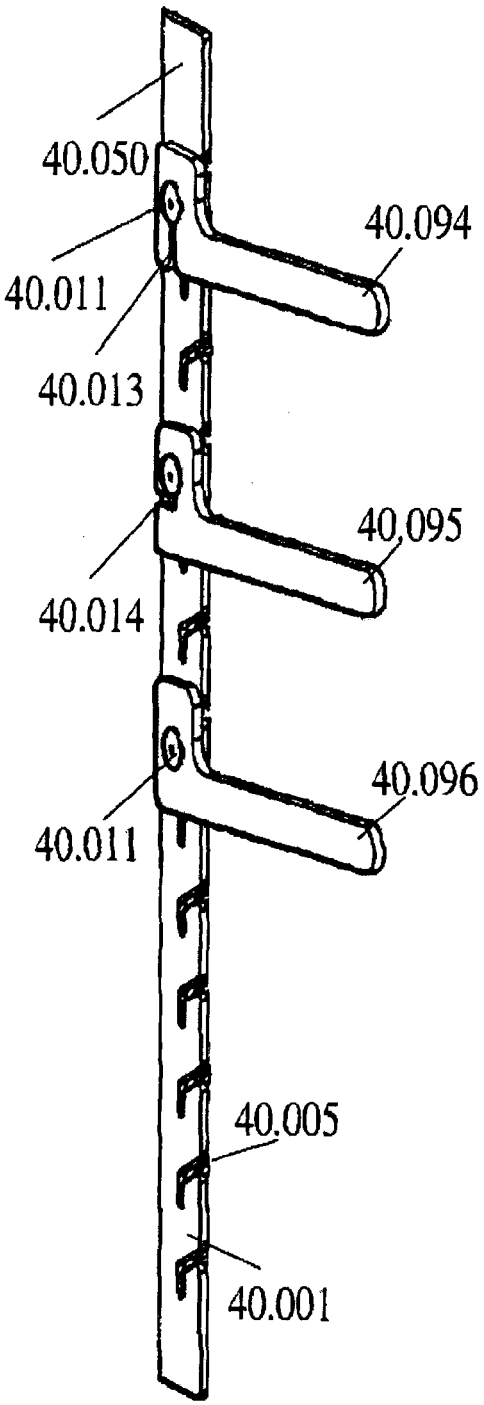

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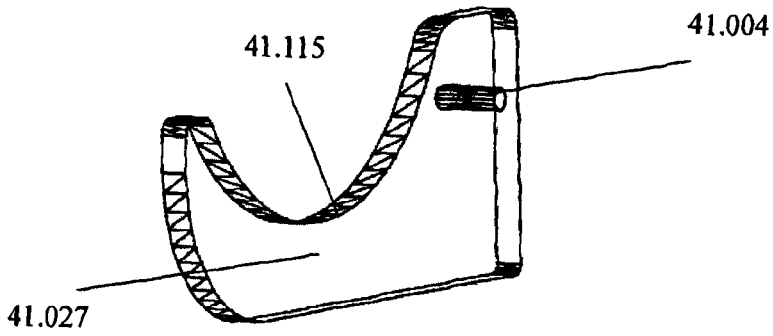

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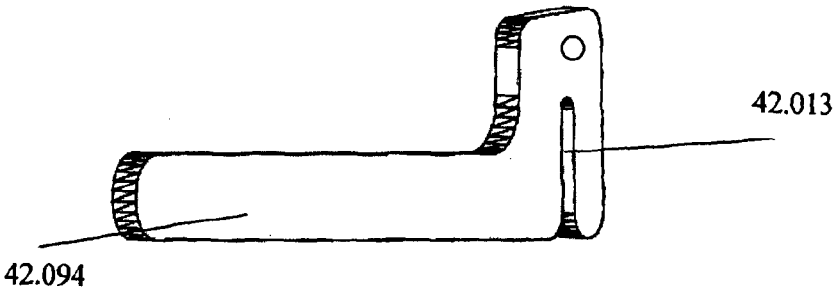

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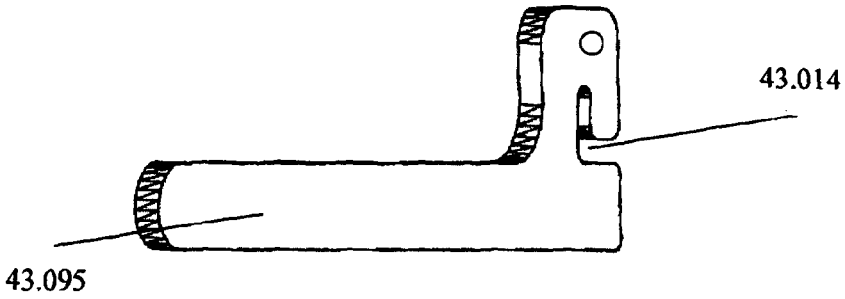

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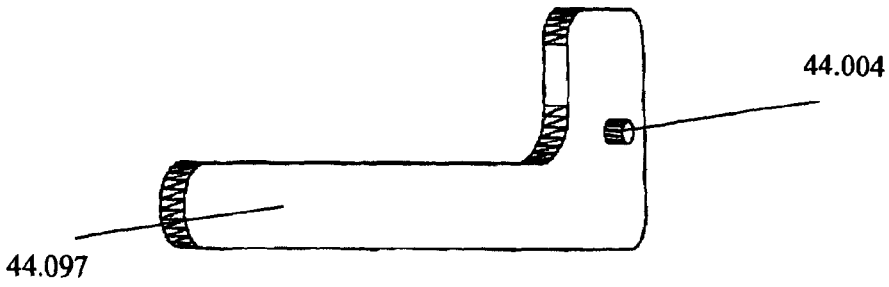

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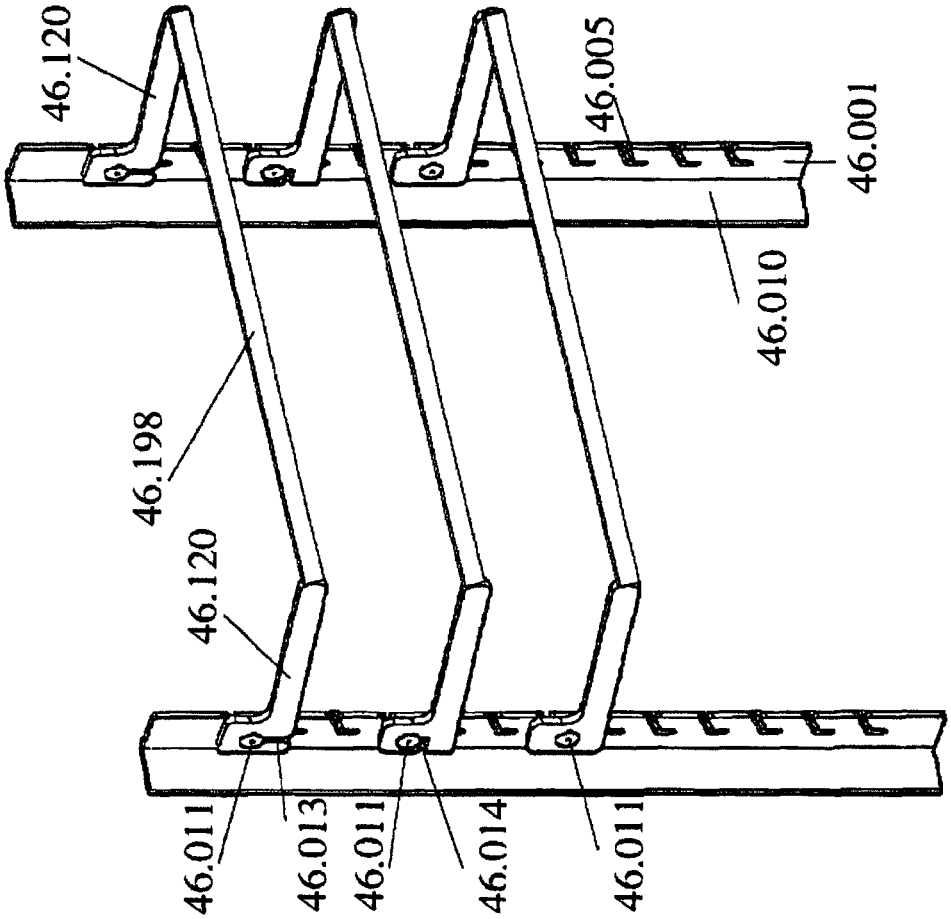

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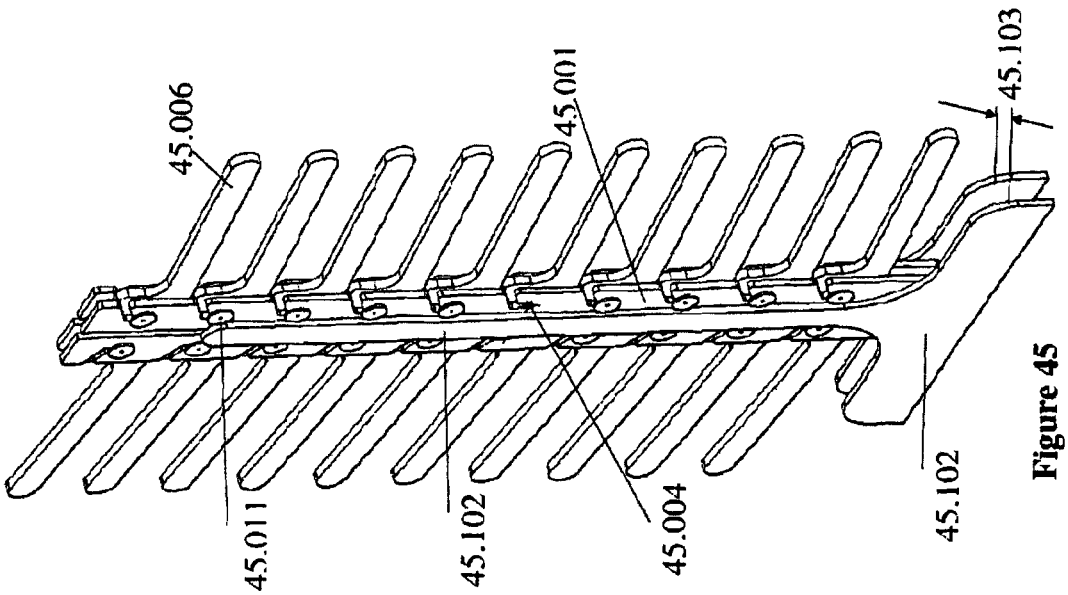

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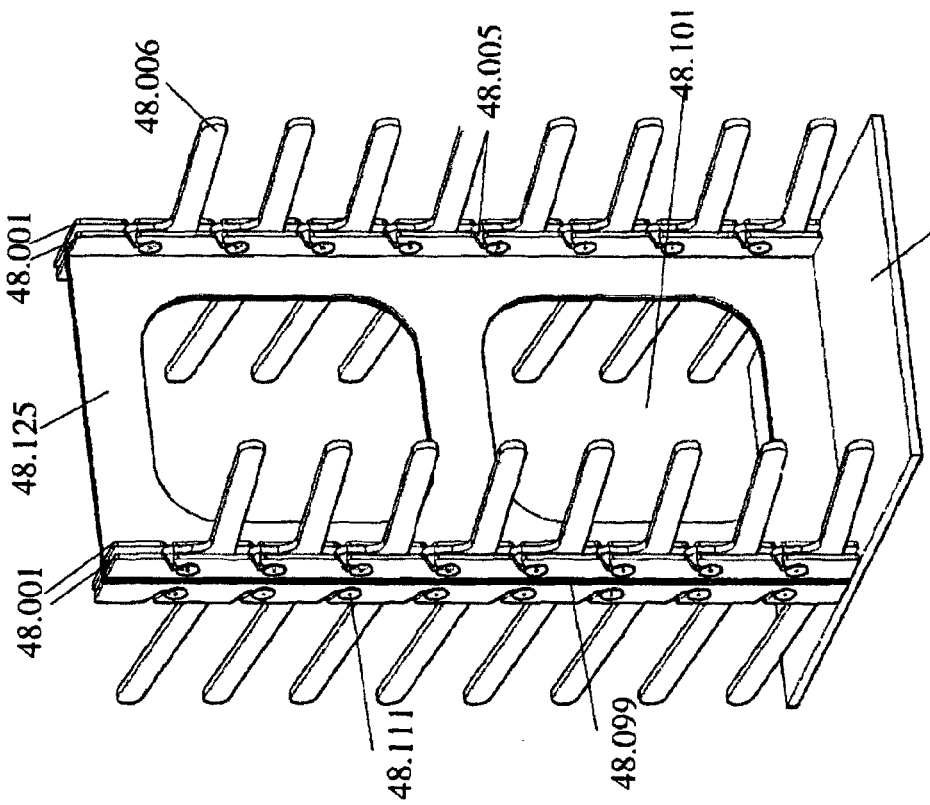

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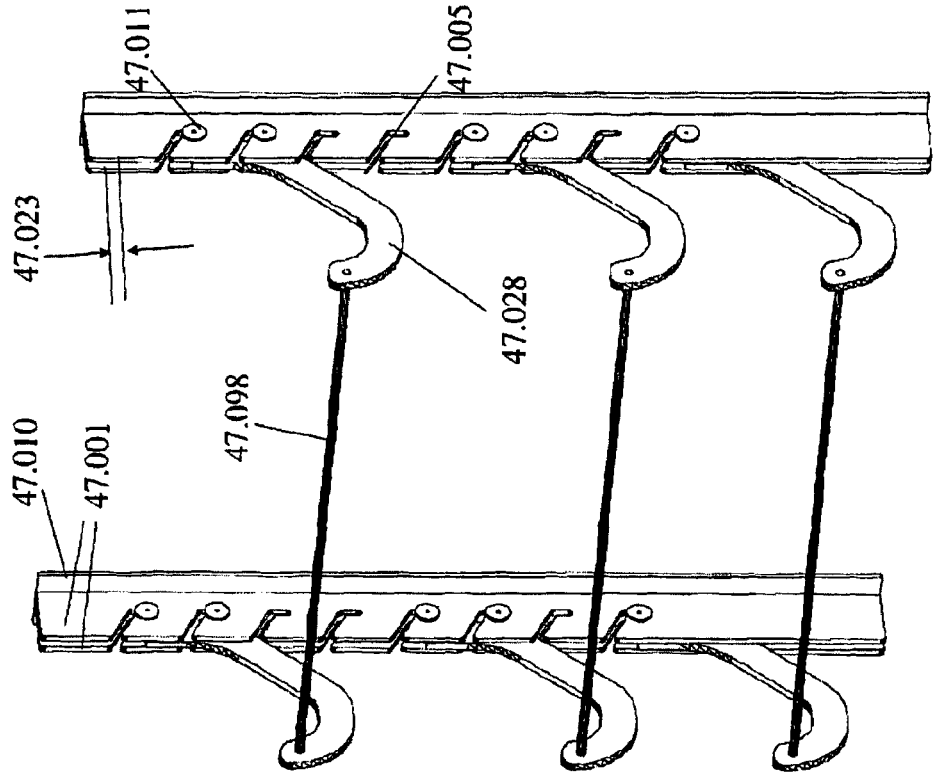

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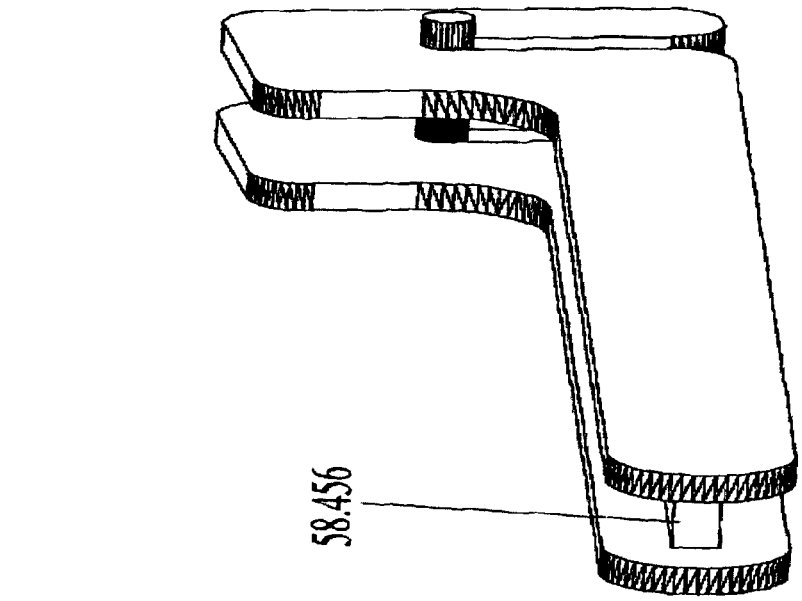
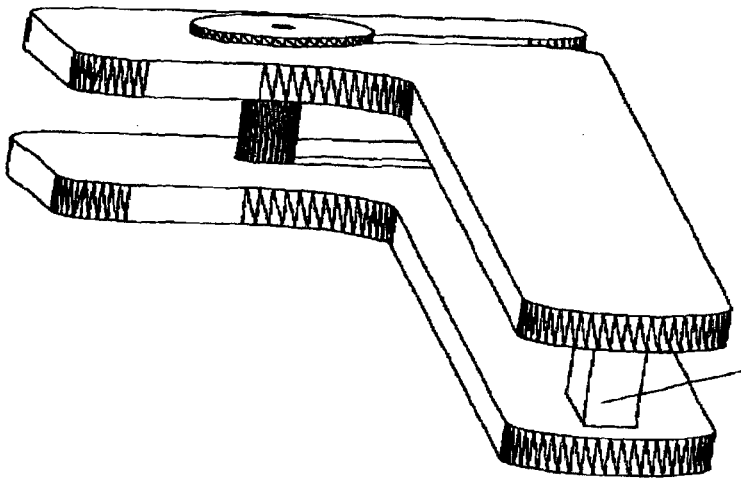


Figure 58



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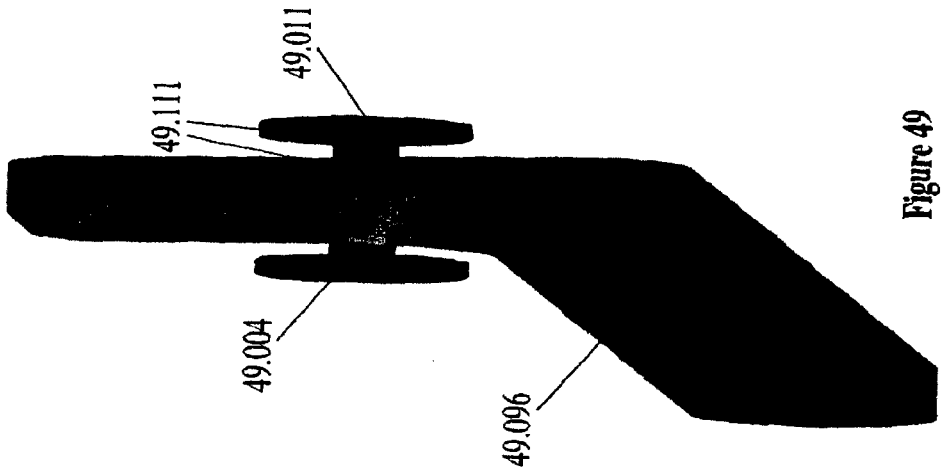

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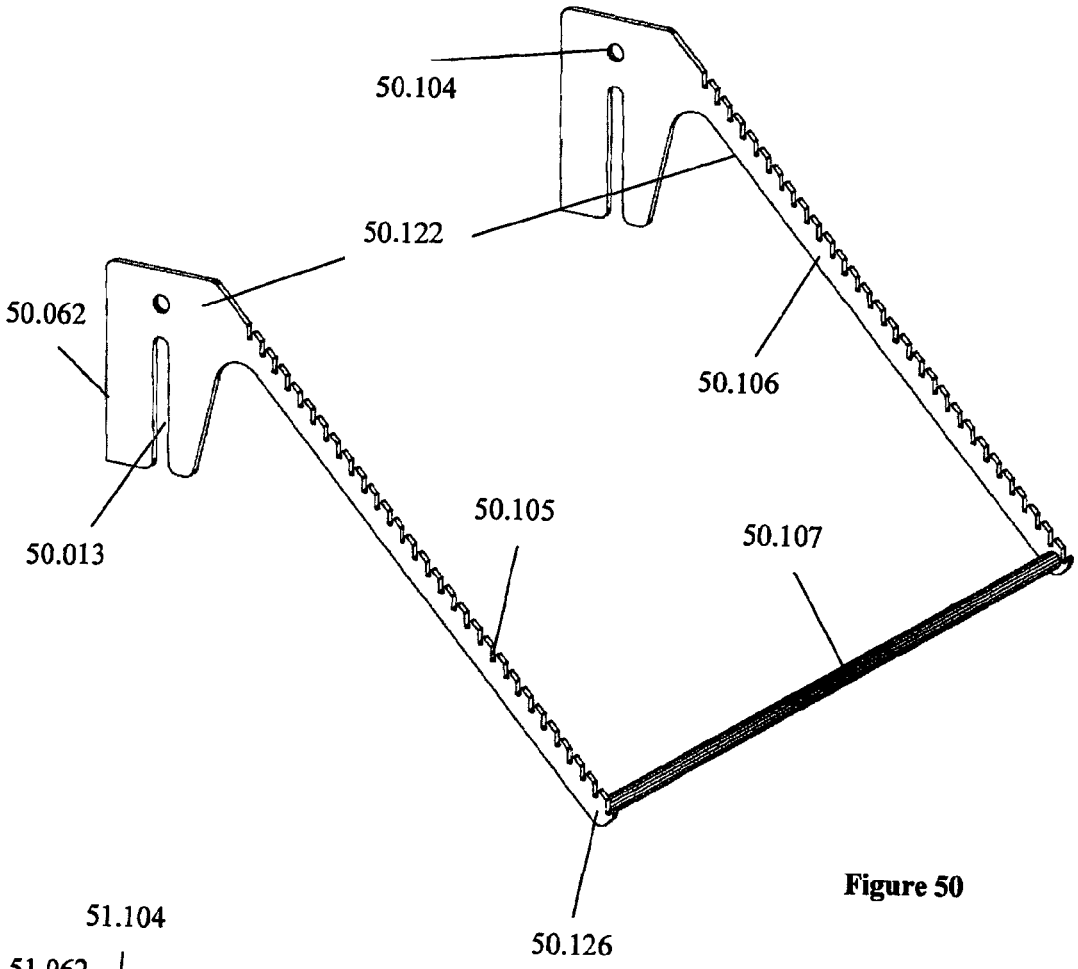

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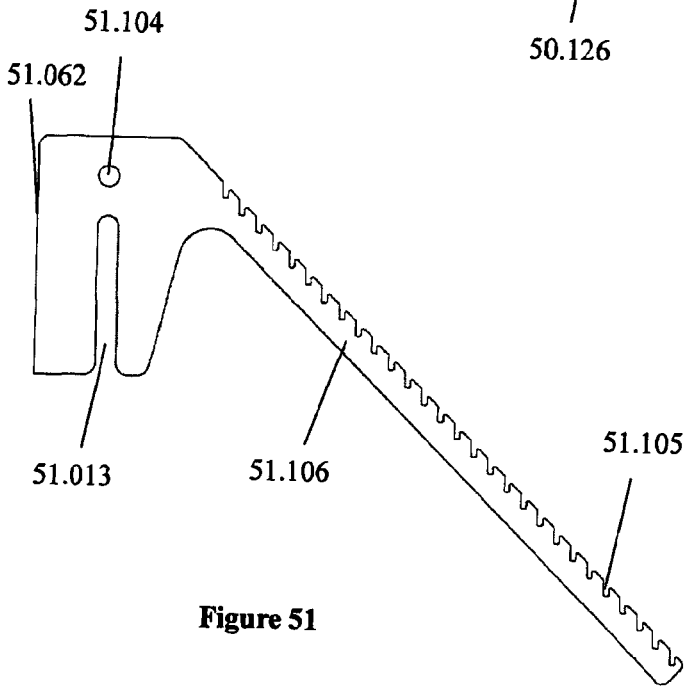

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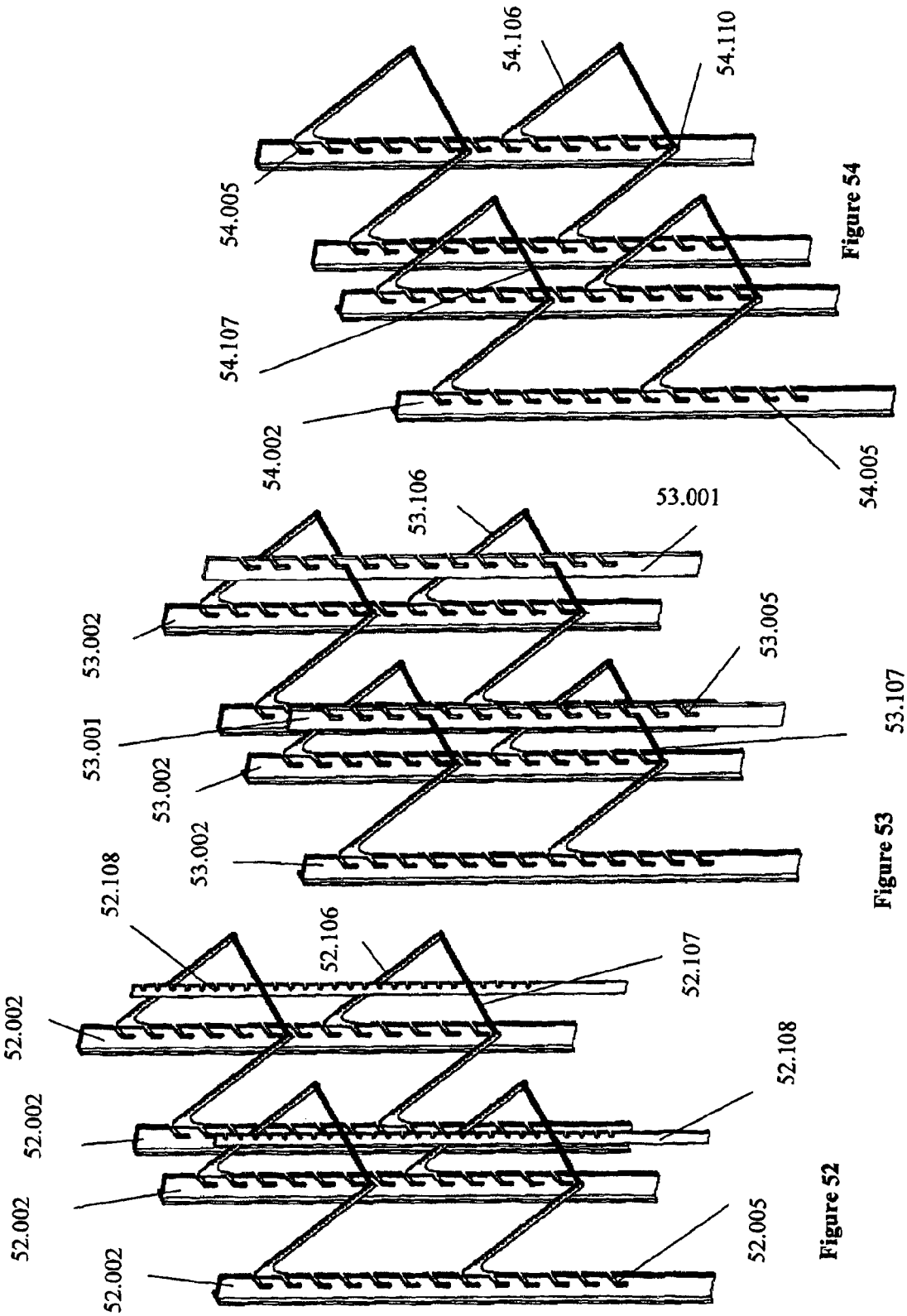
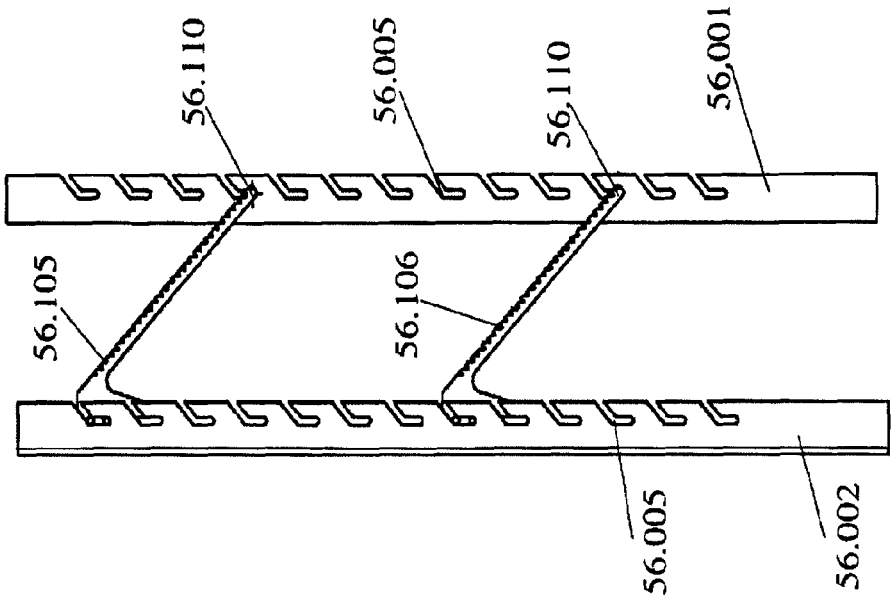


Figure 54

Figure 53

Figure 52



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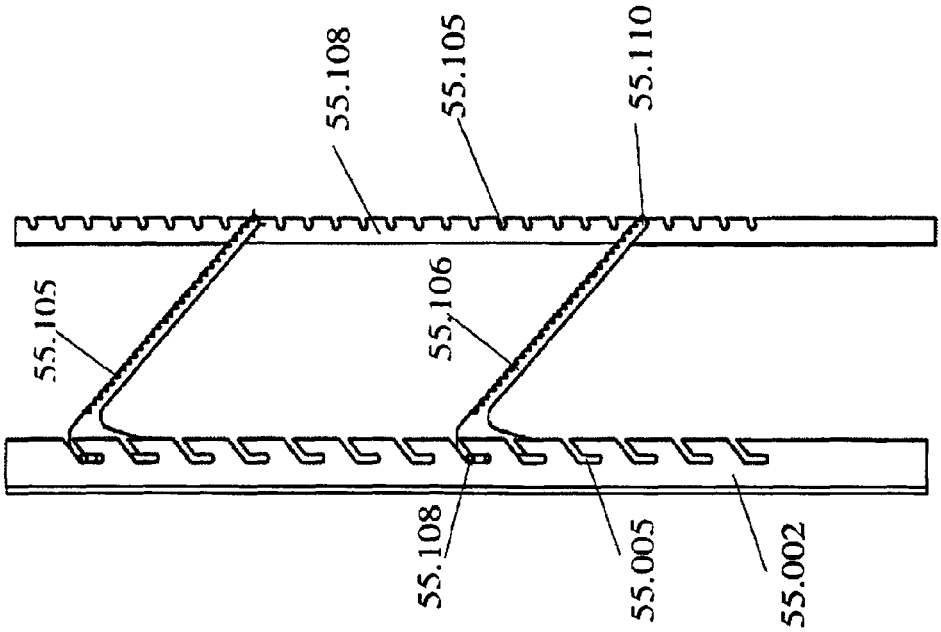

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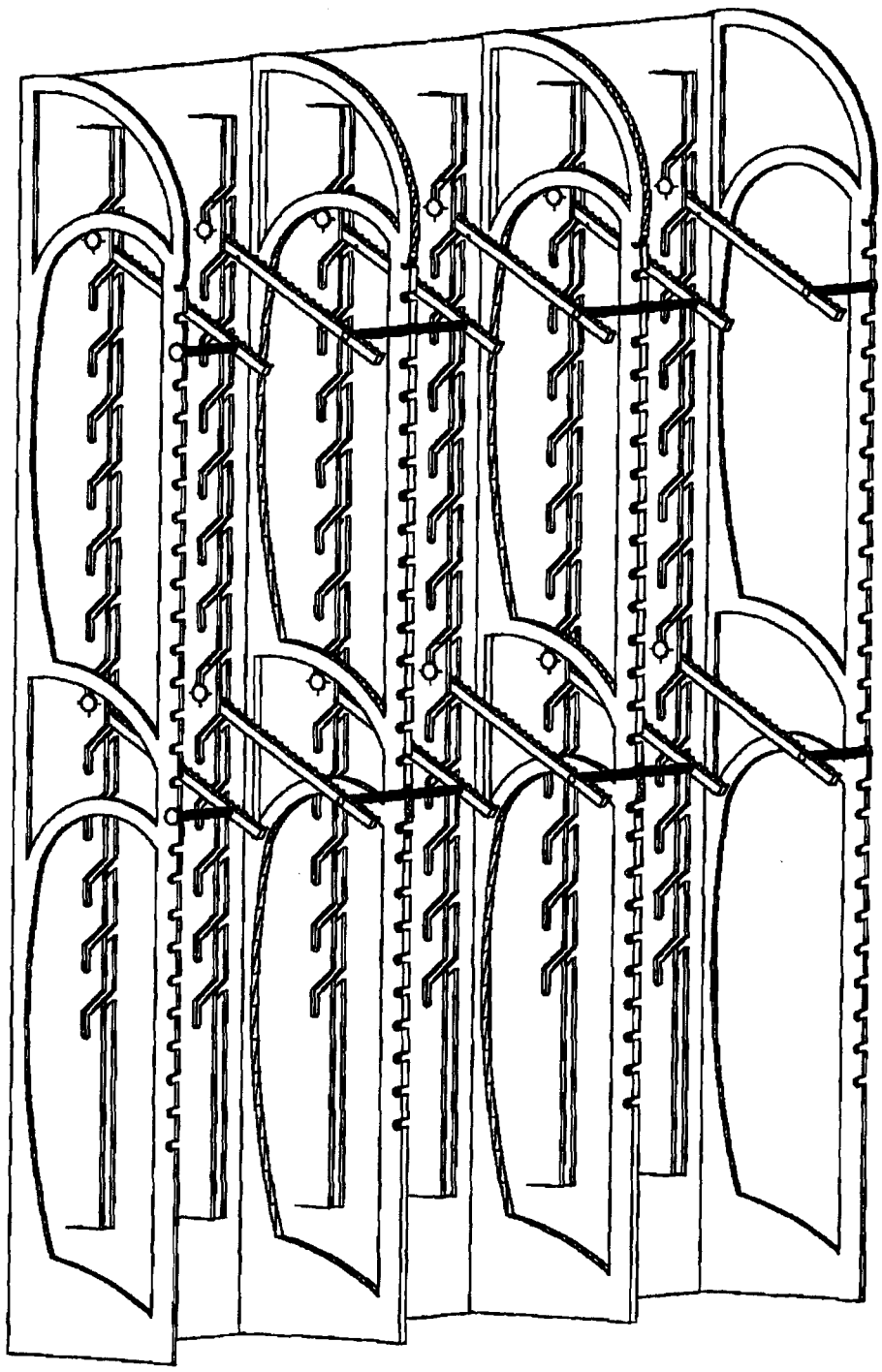

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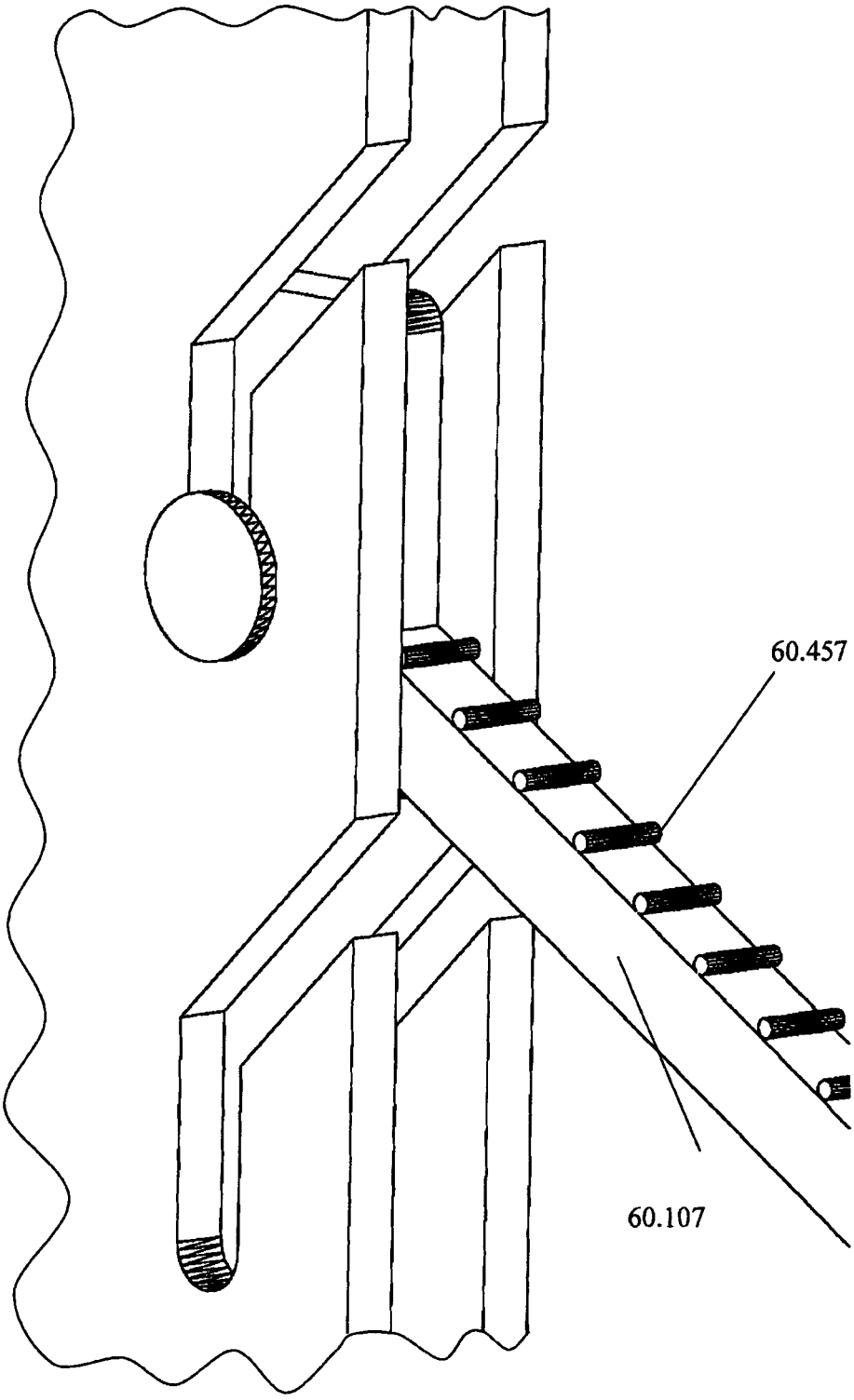

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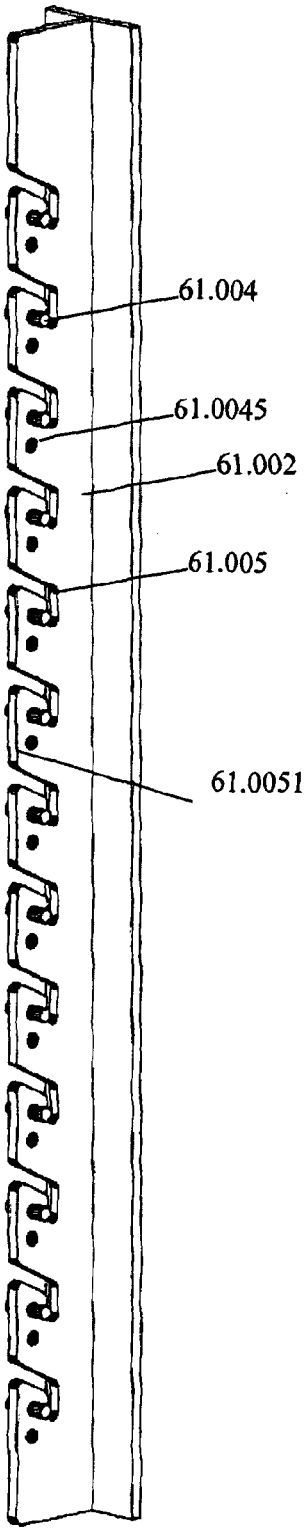

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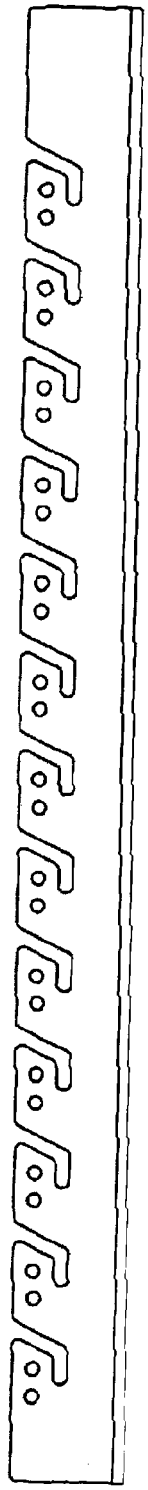

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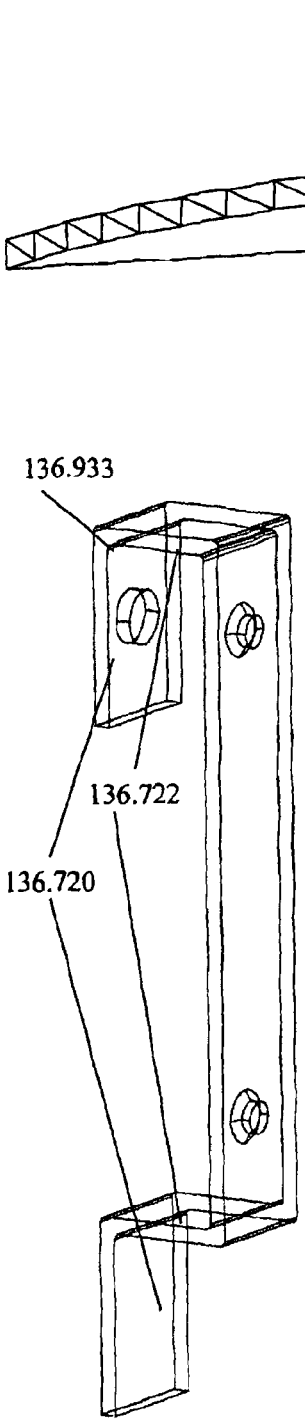
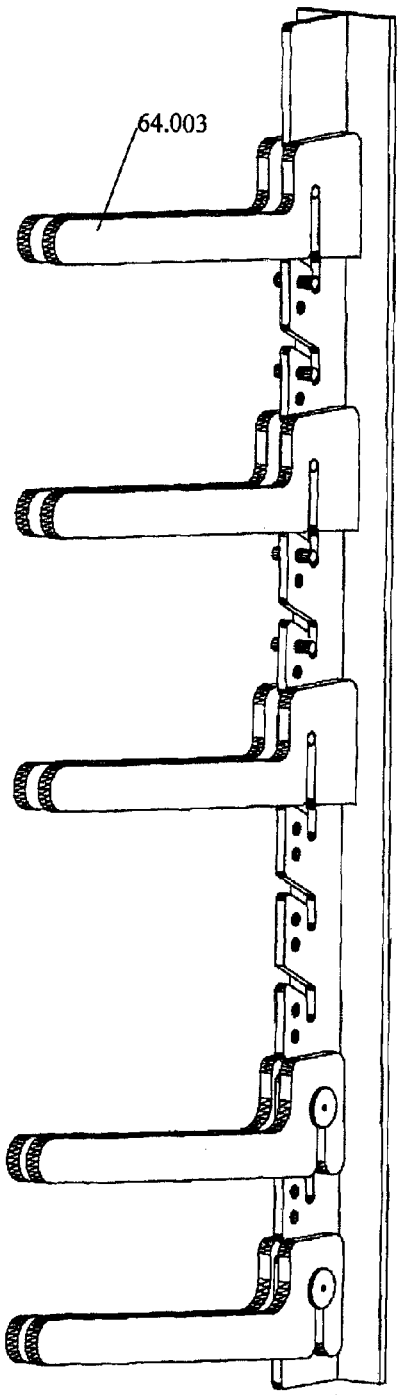


Figure 136

Figure 63



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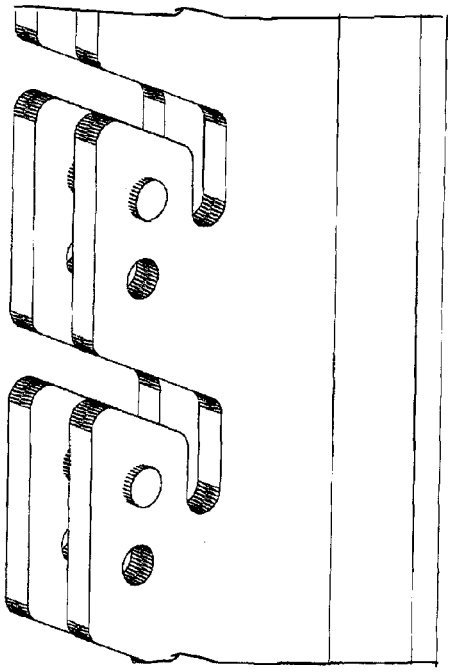

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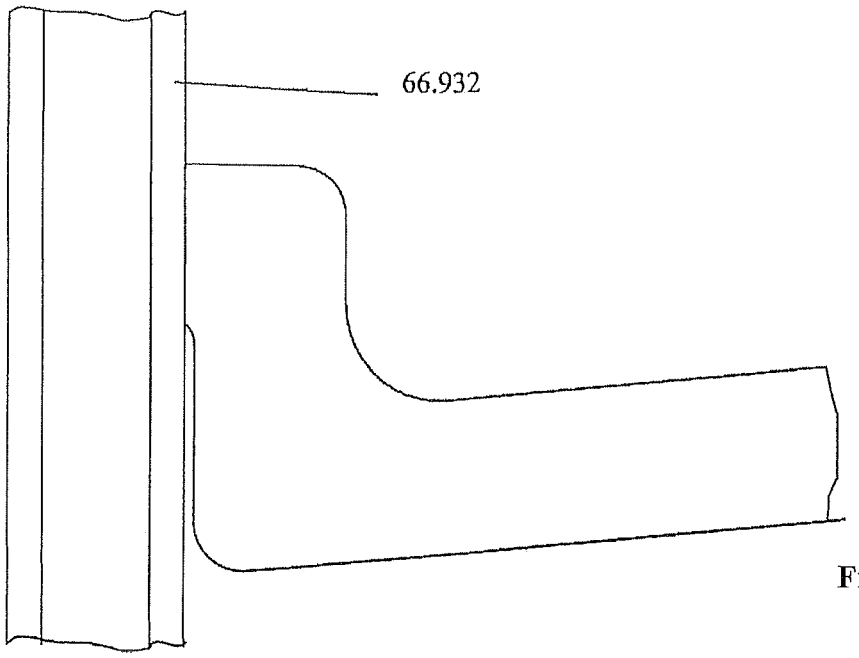

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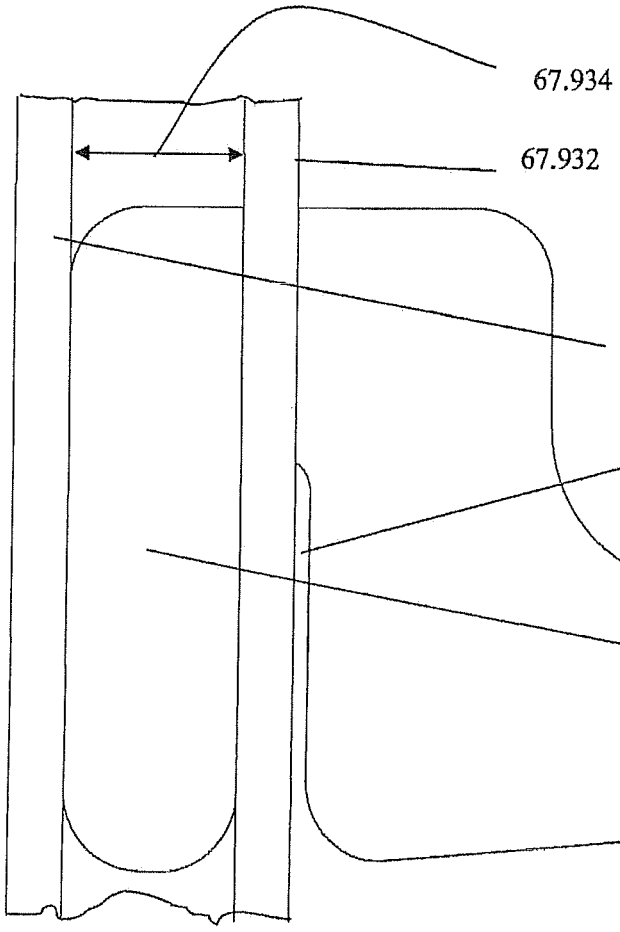

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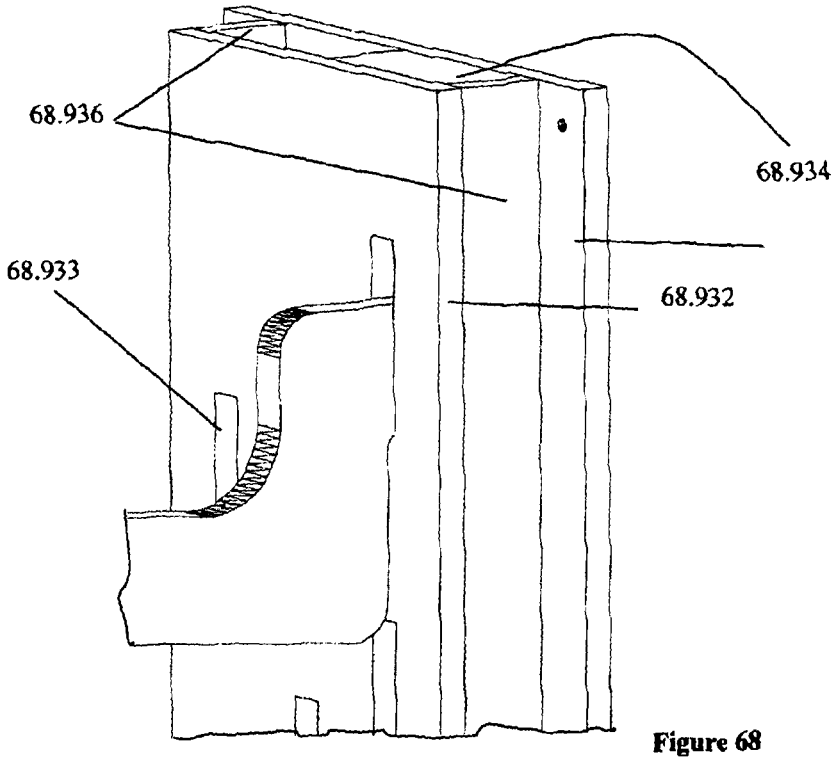

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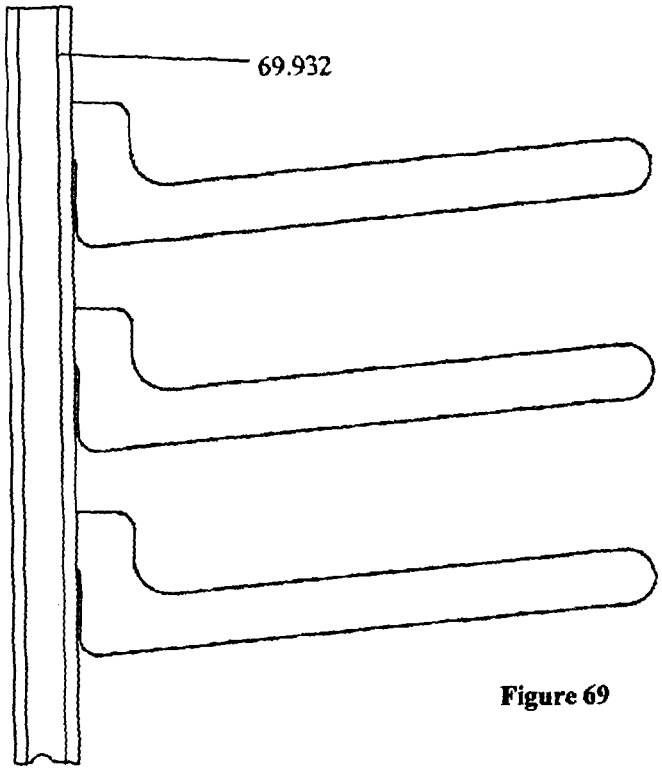

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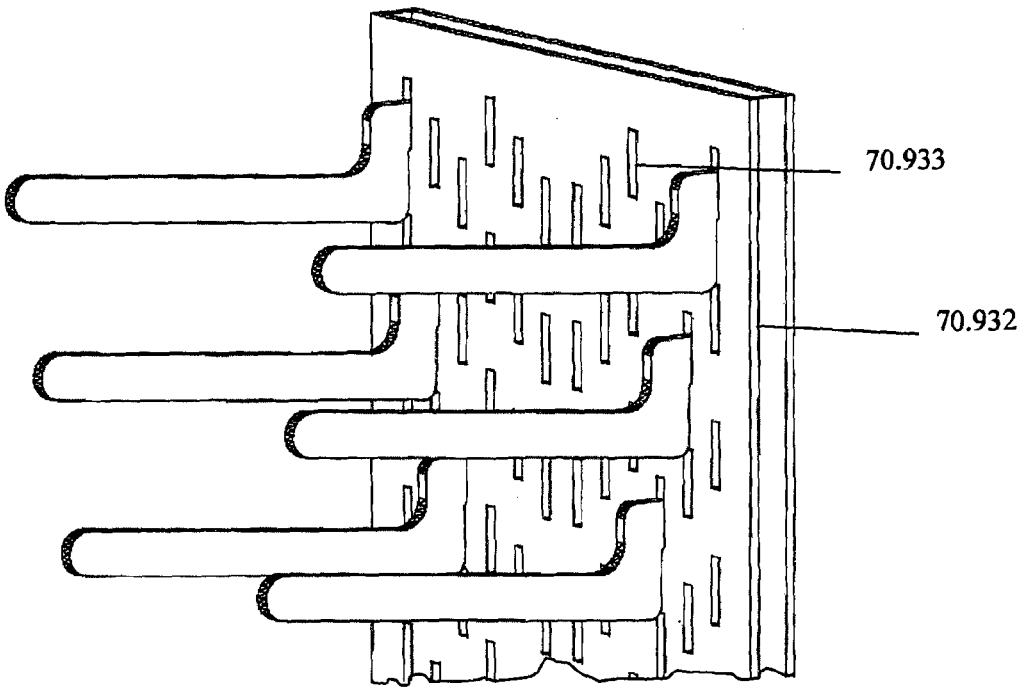

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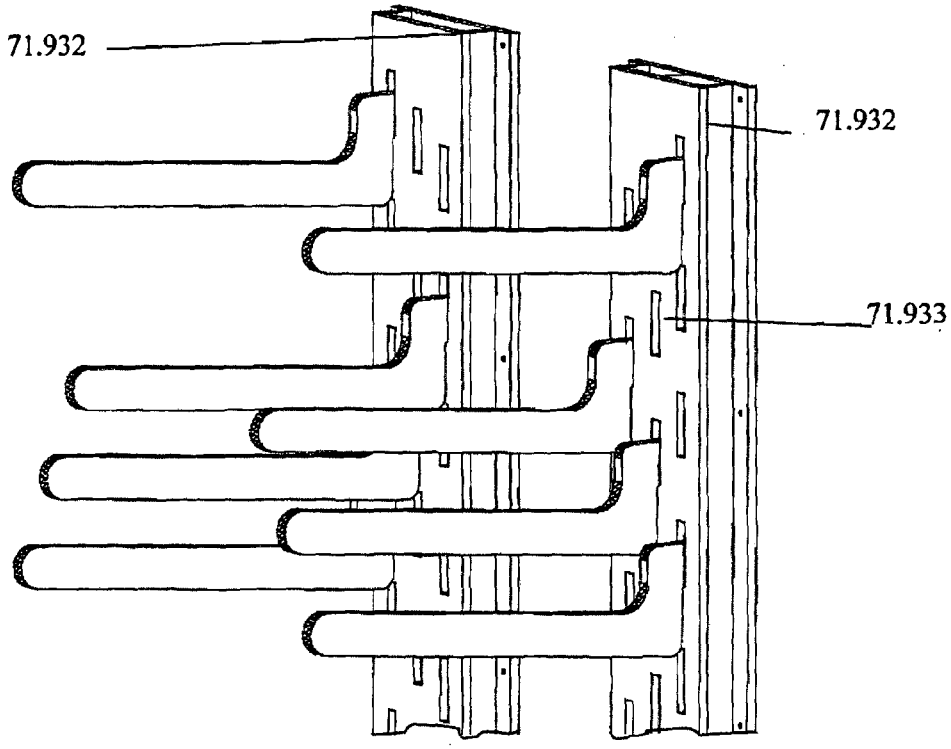

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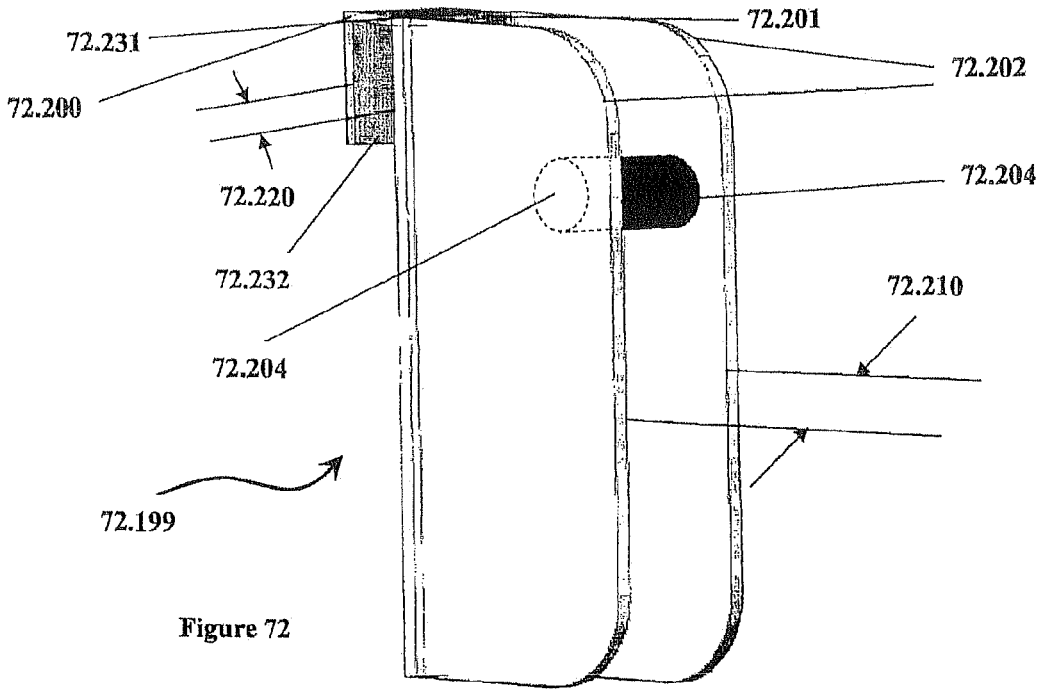

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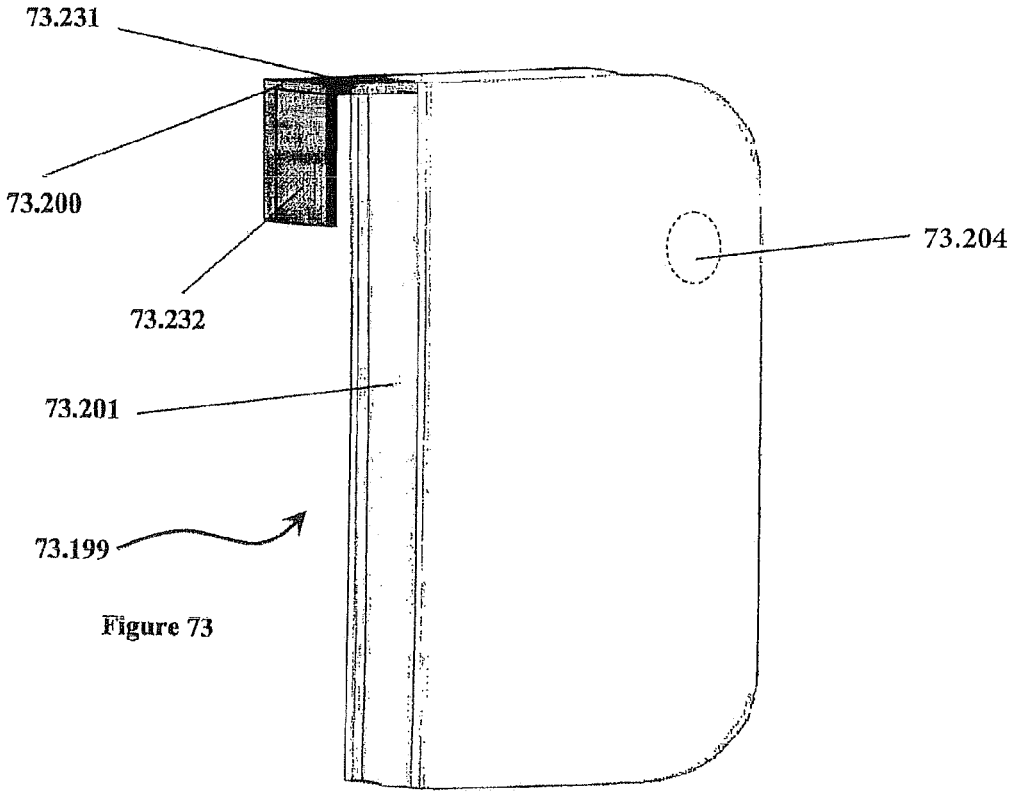

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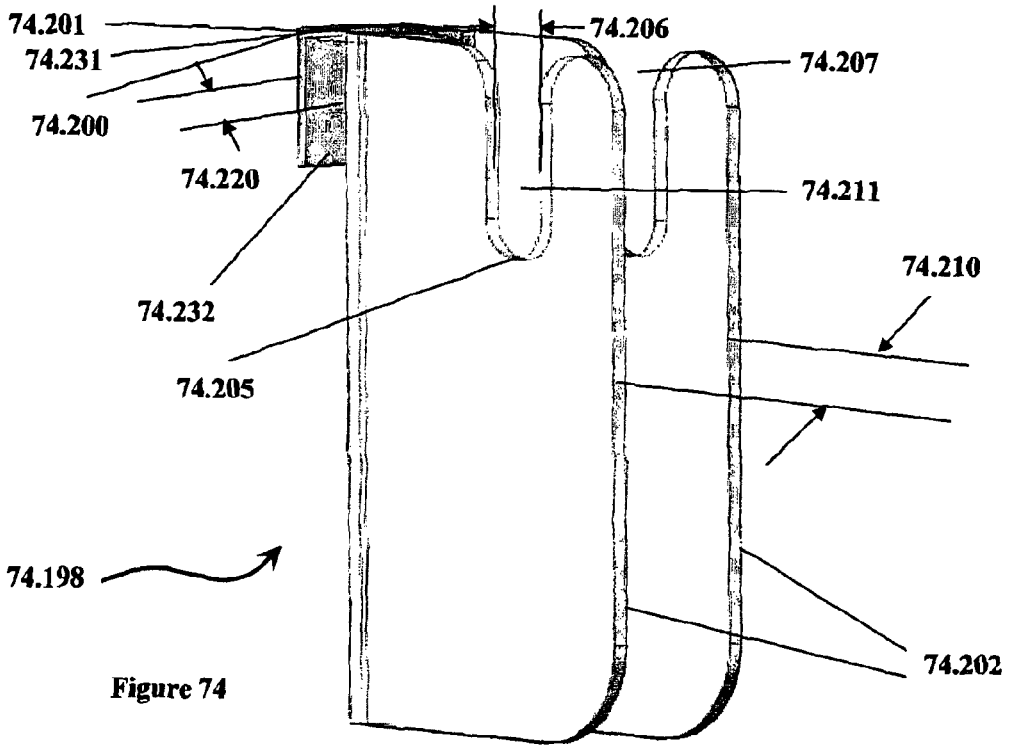

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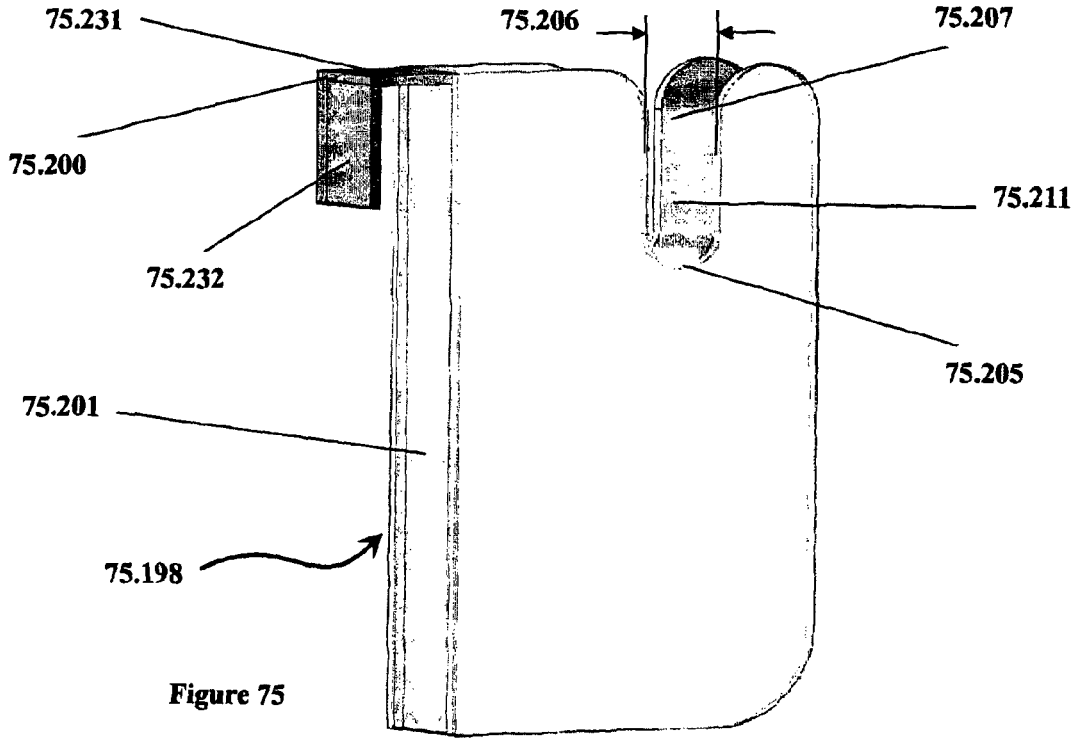

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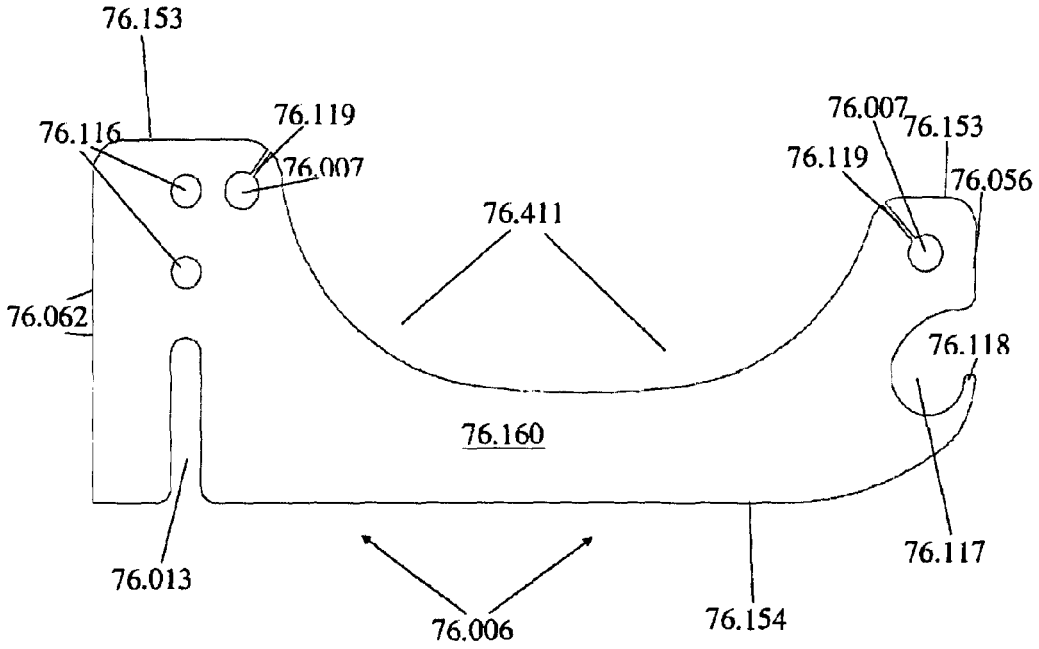

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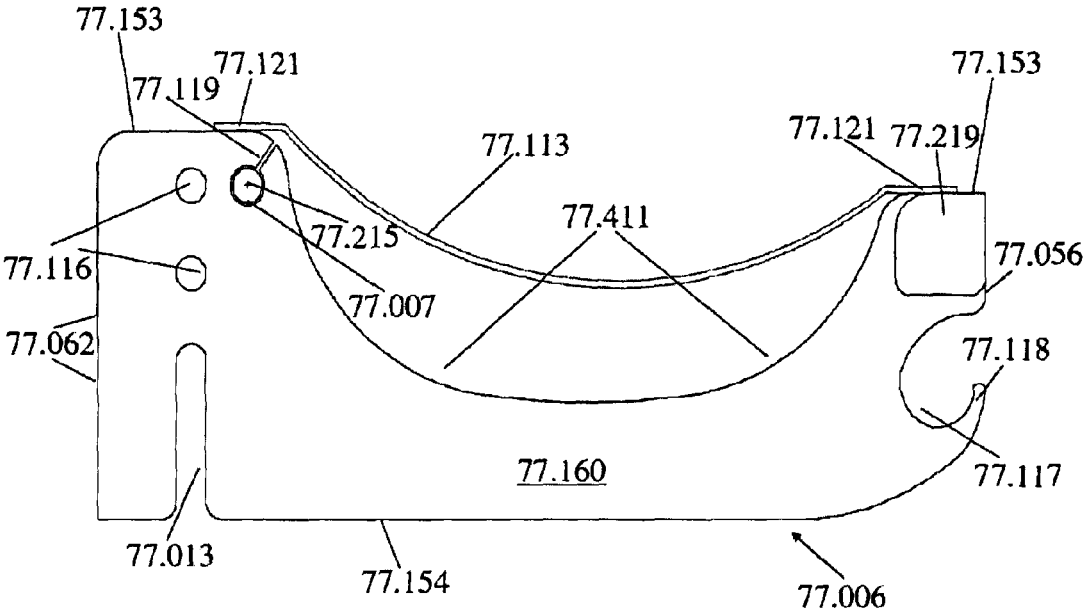

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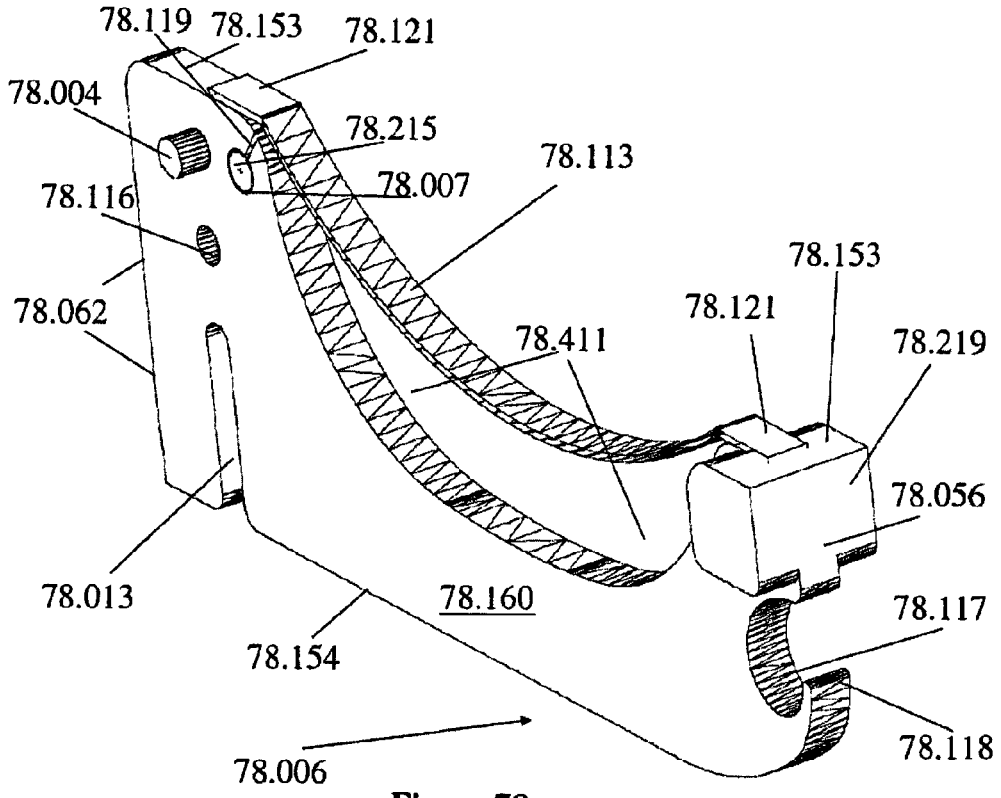

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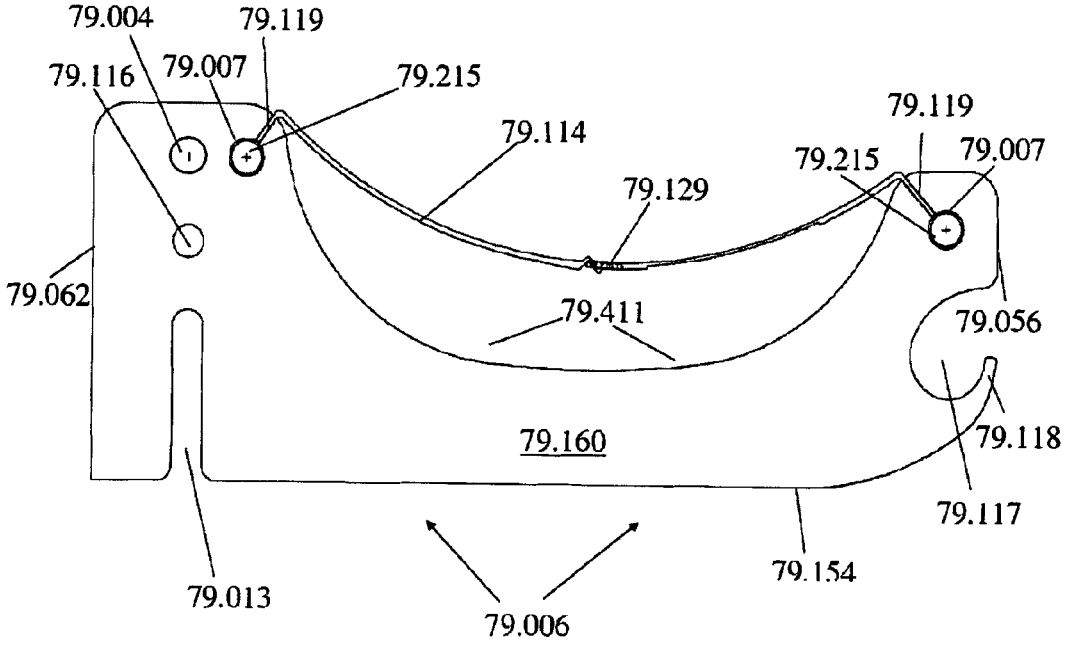

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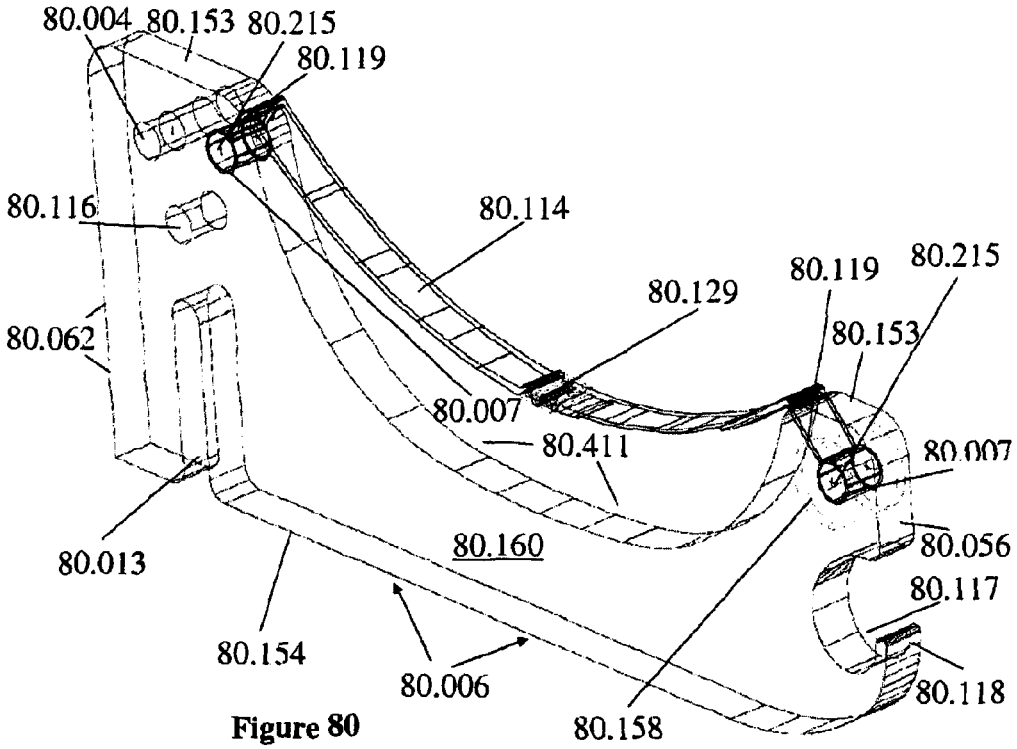

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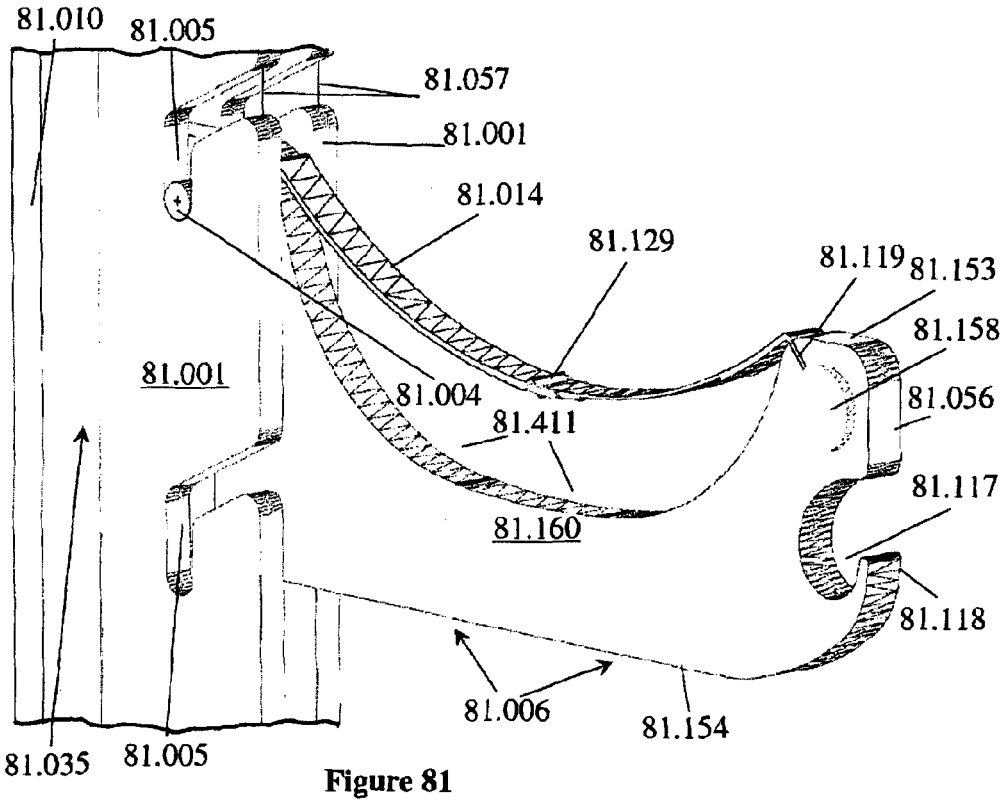

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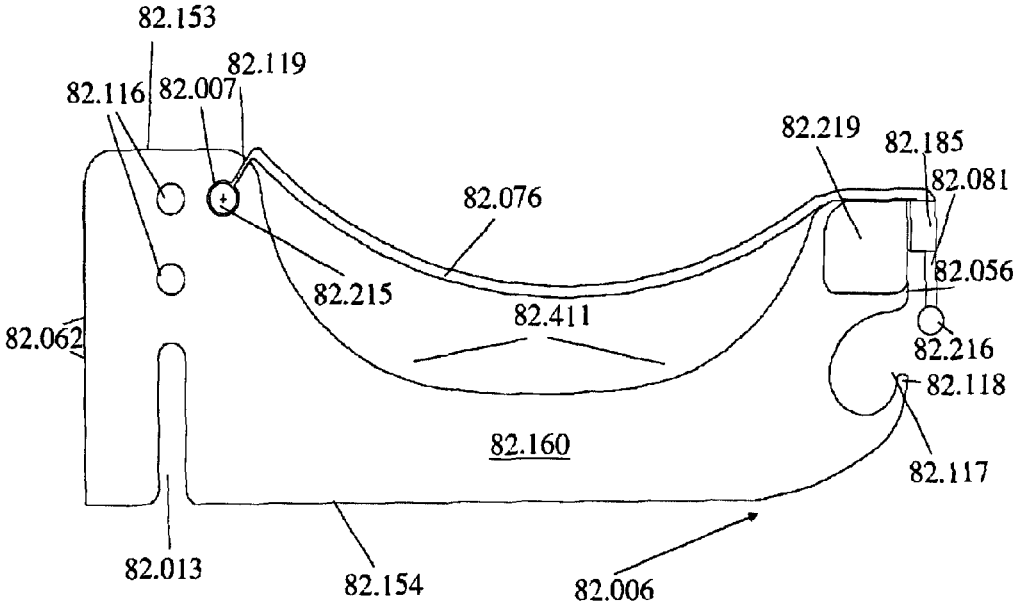

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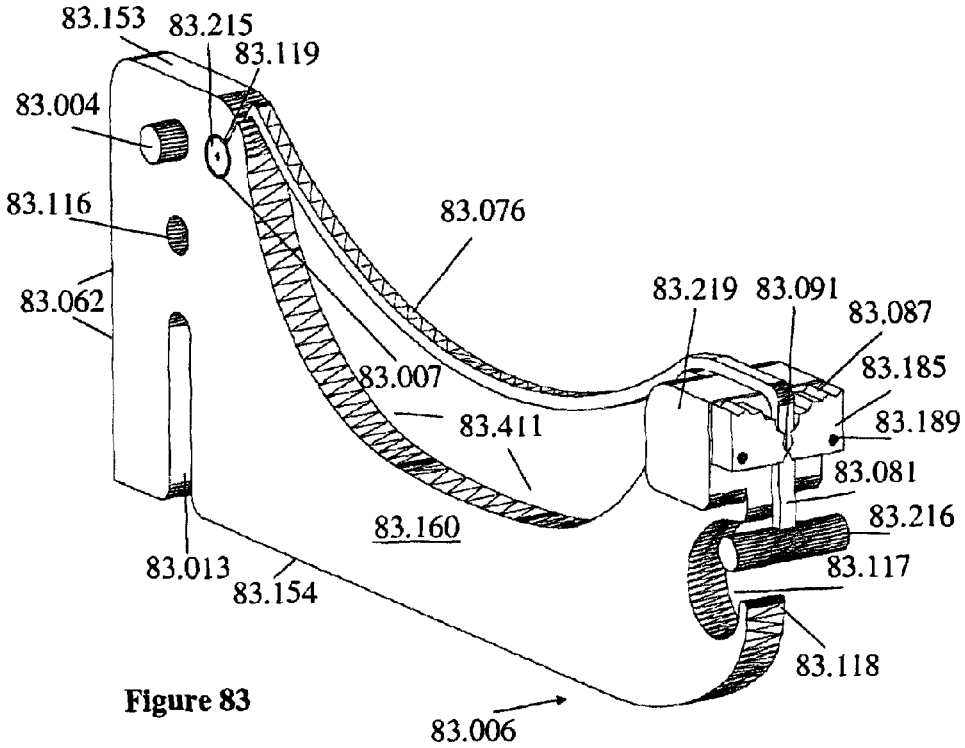

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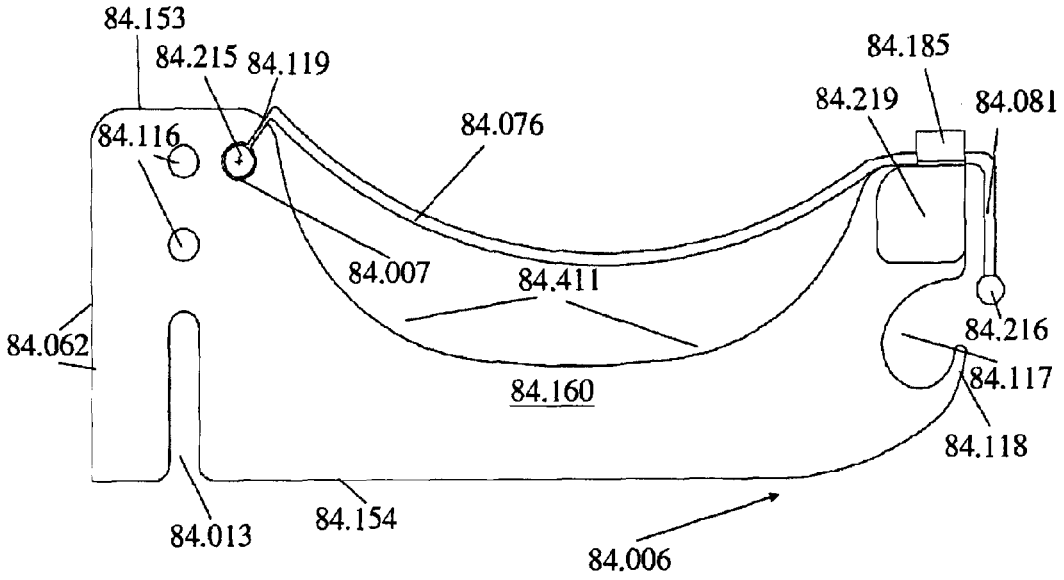

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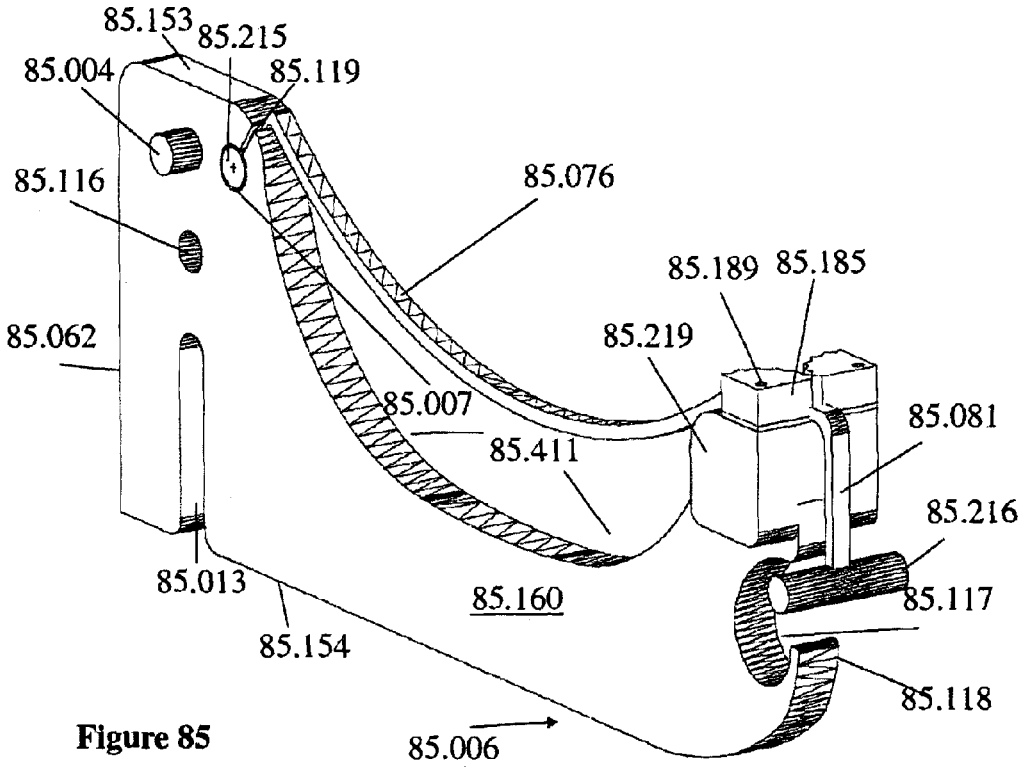

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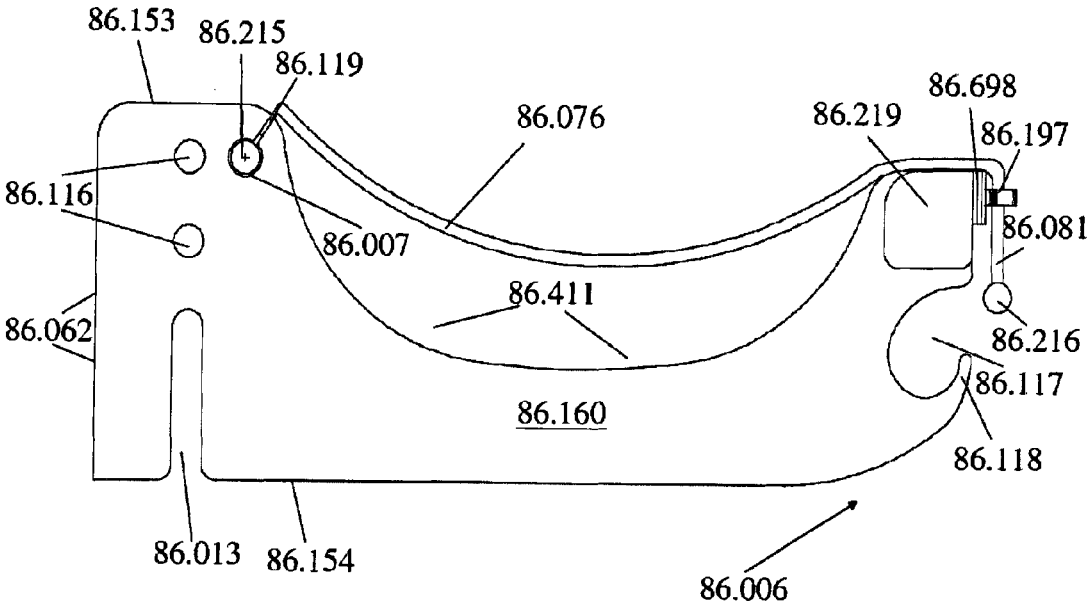

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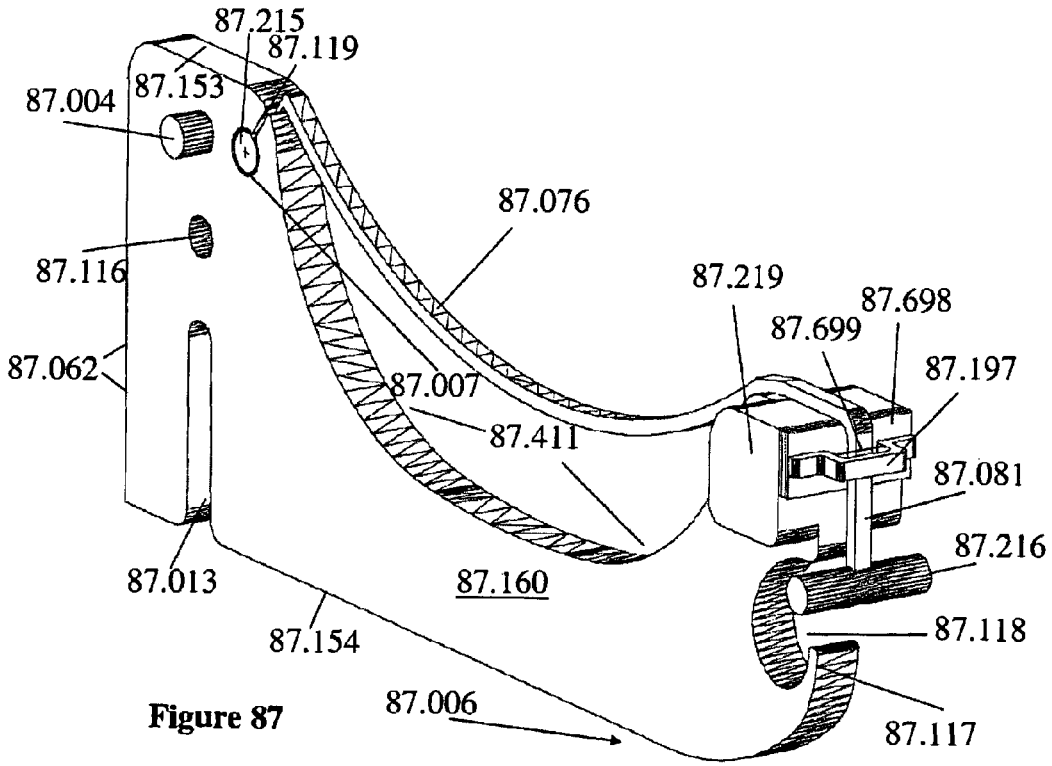

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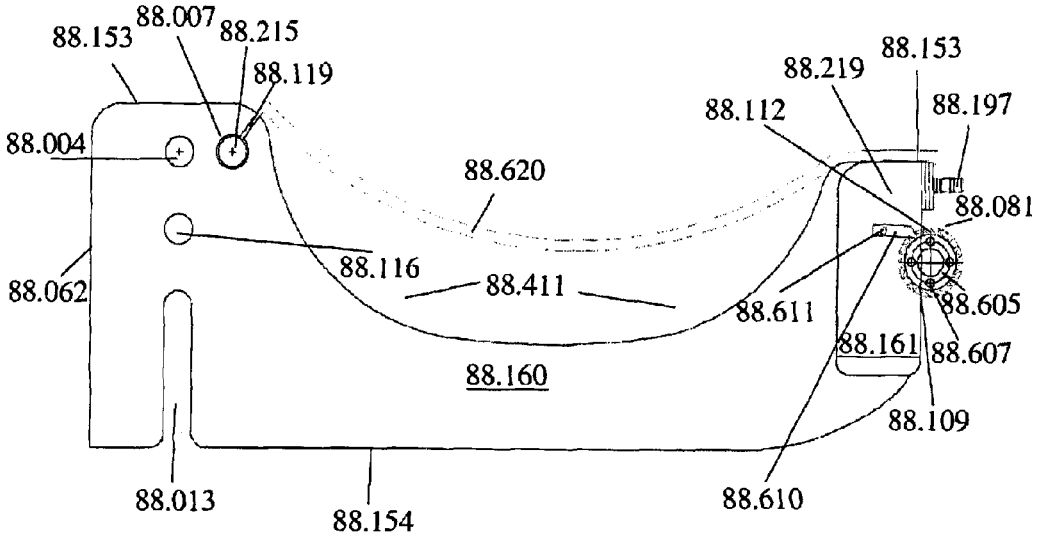

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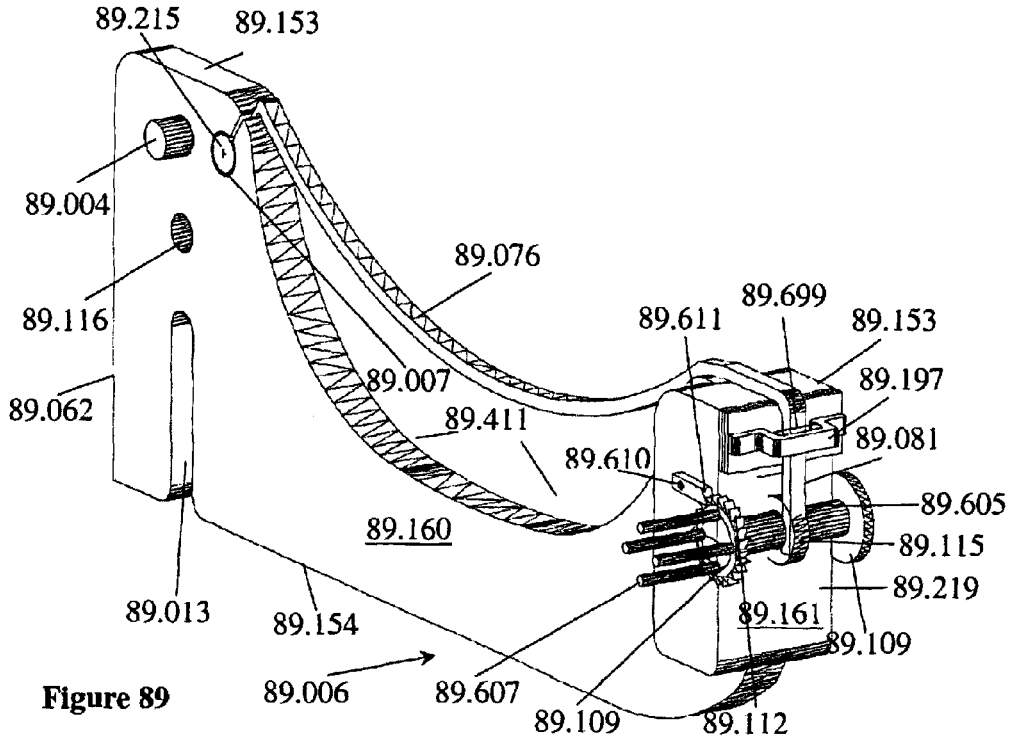

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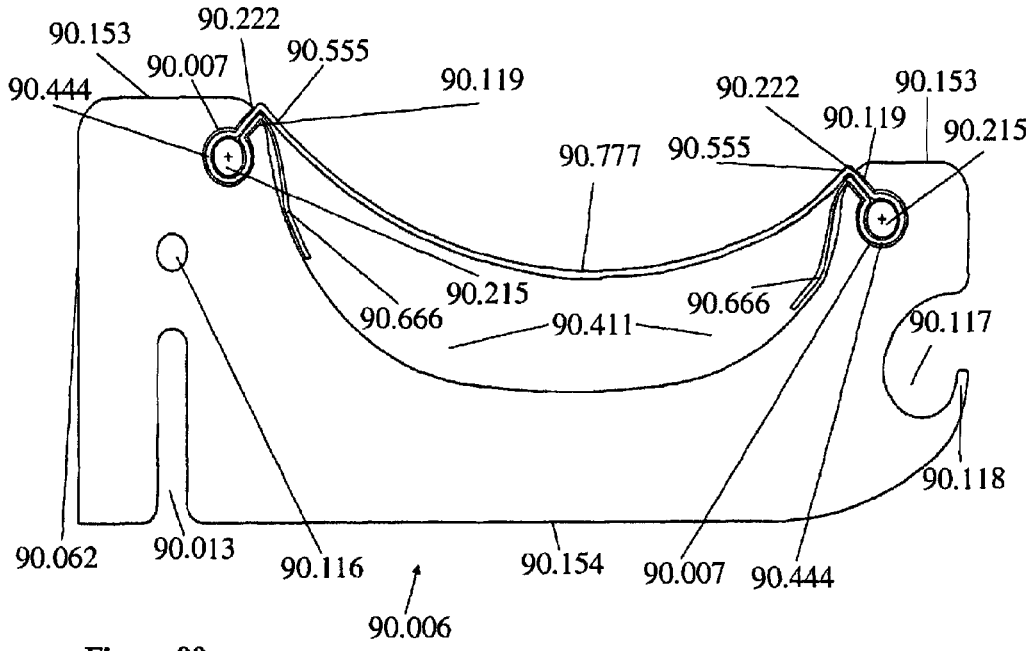

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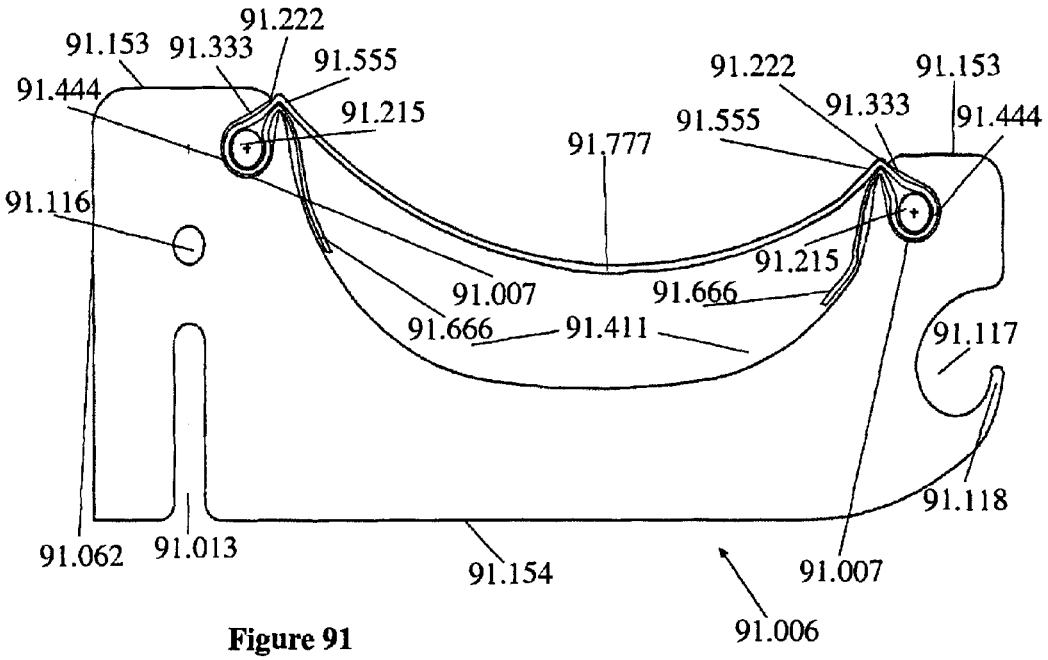

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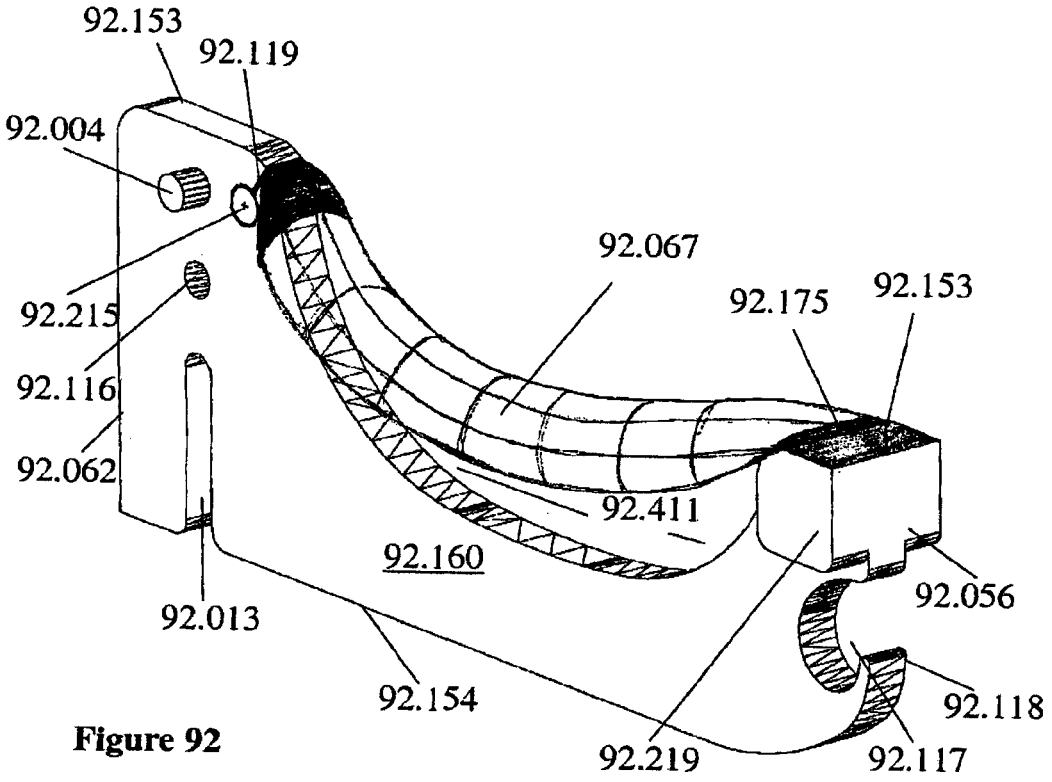

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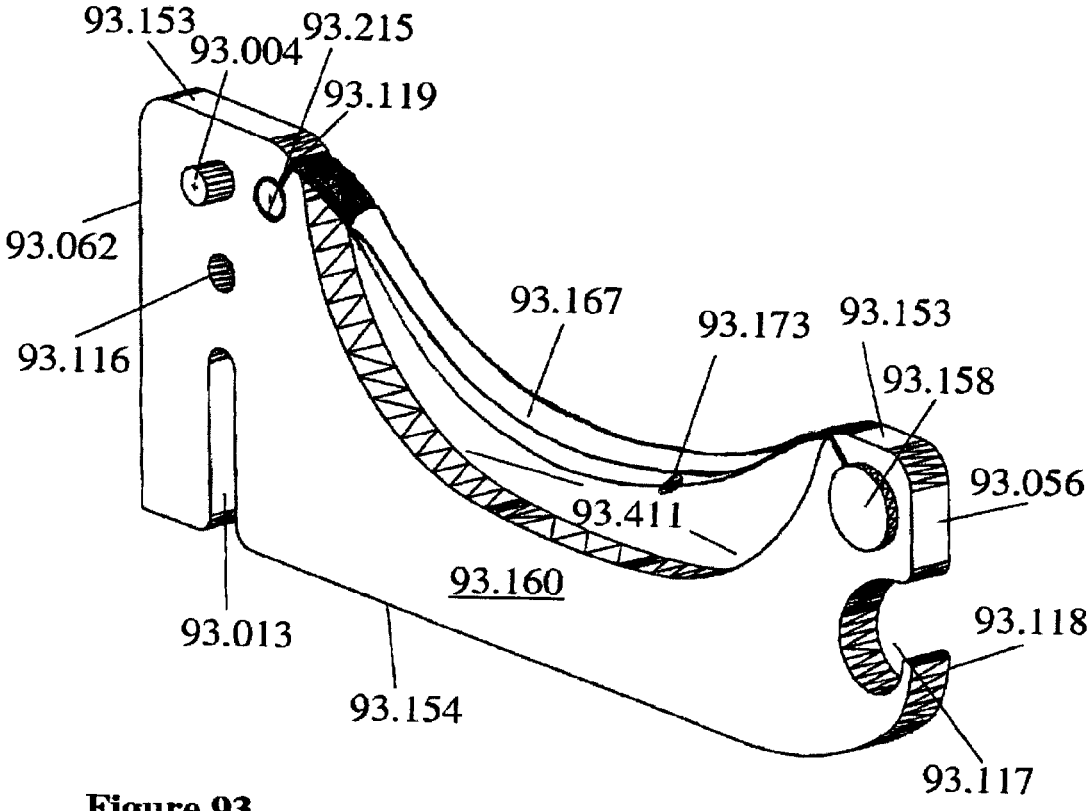

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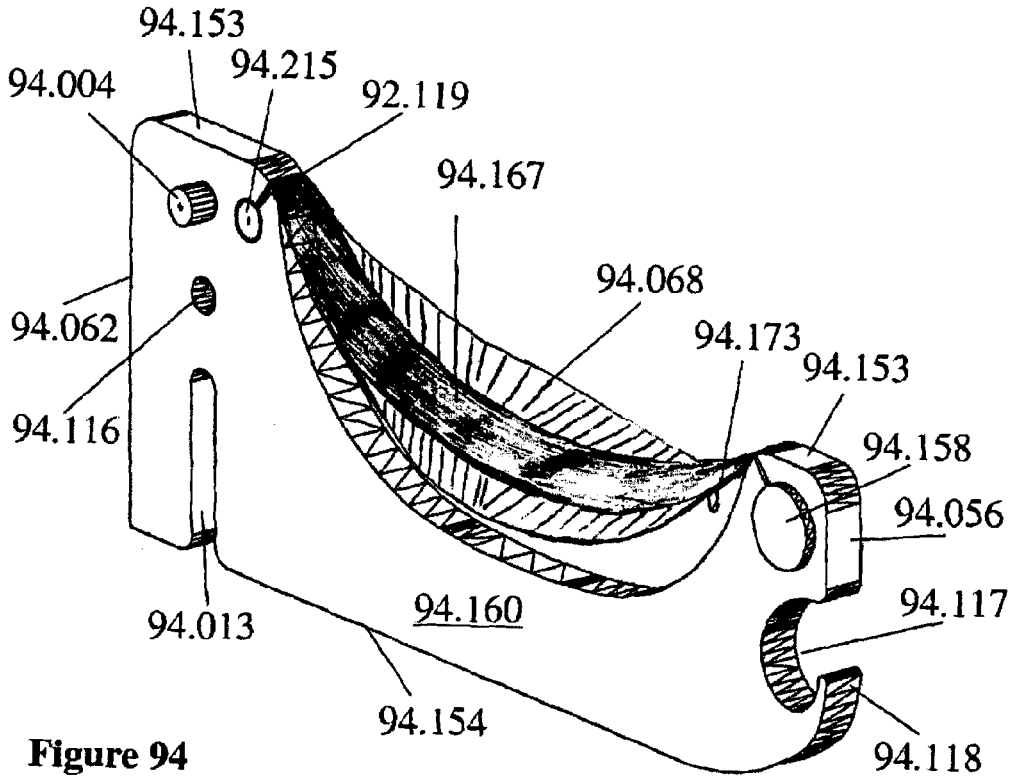

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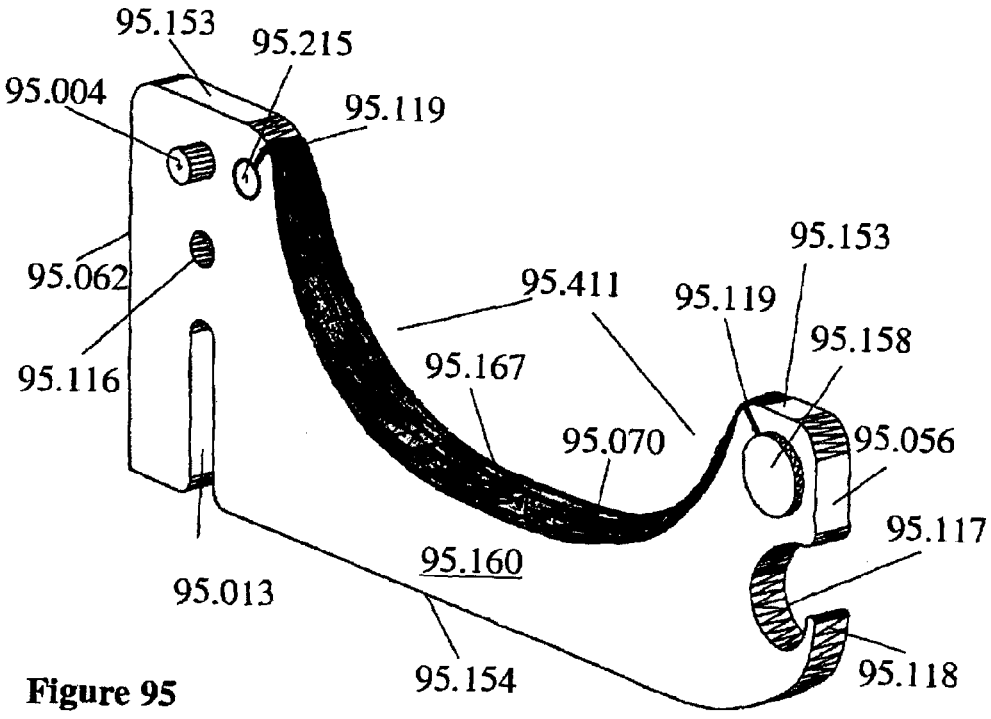

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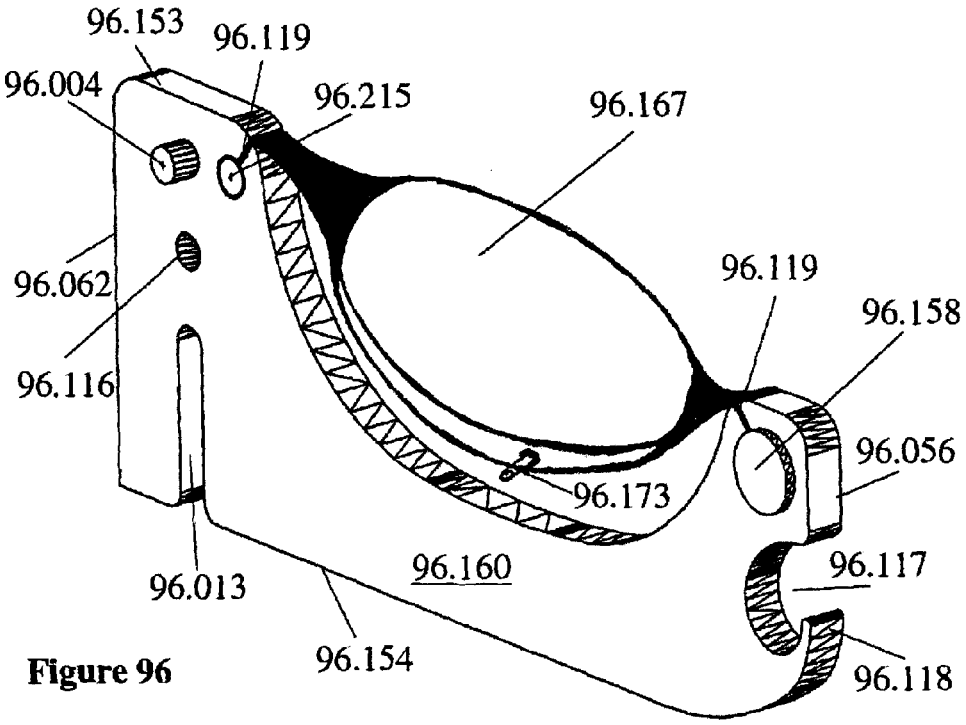

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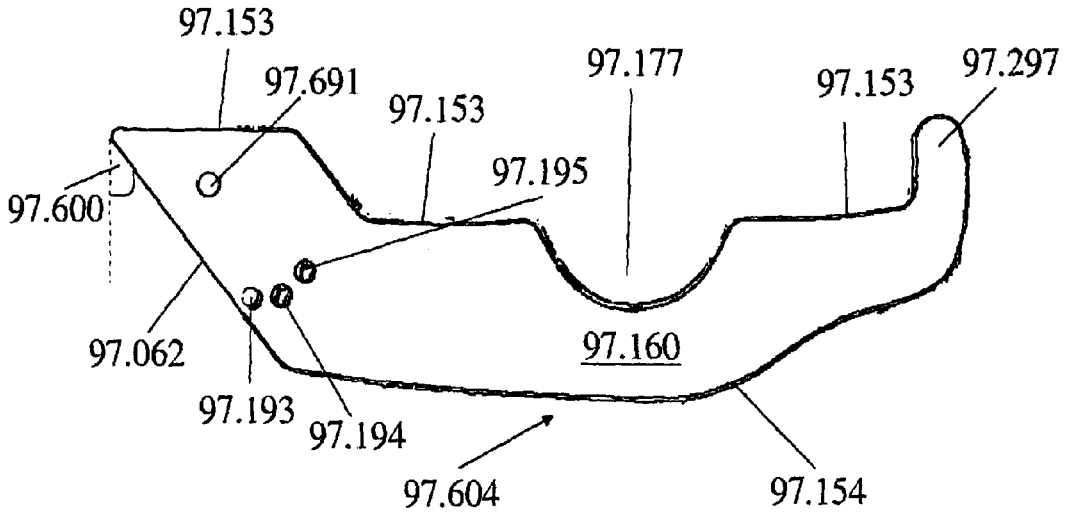

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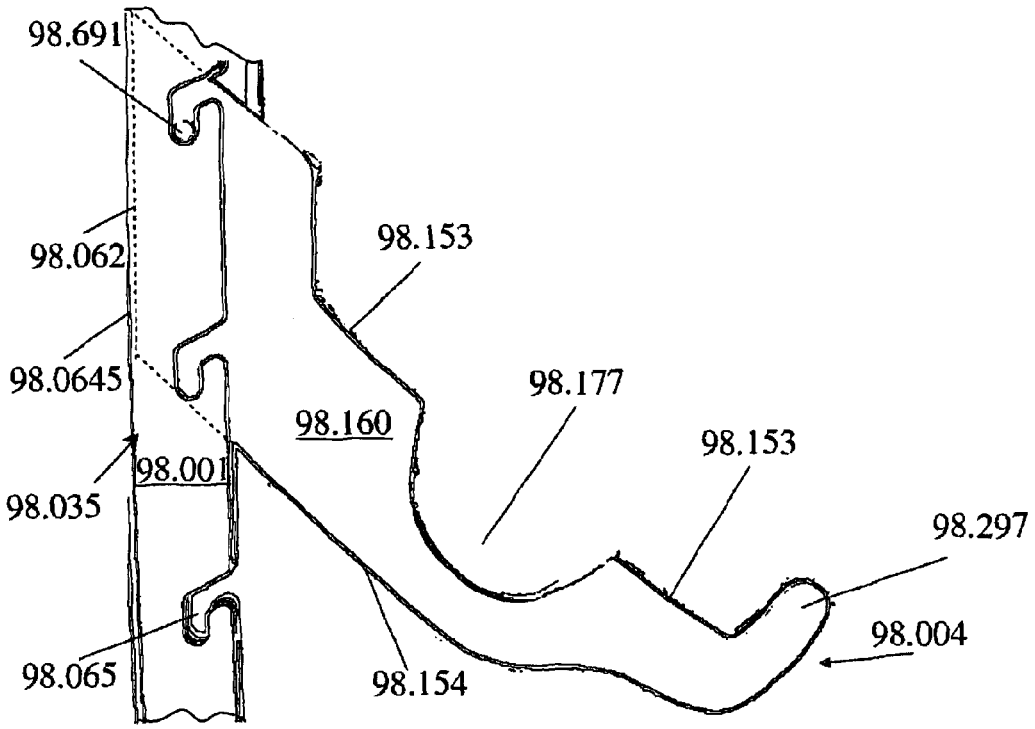

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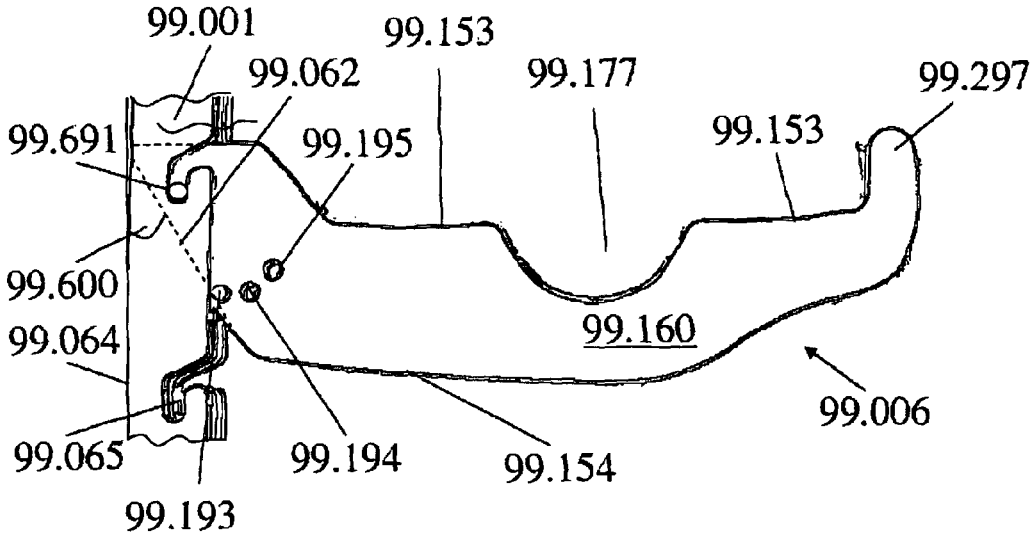

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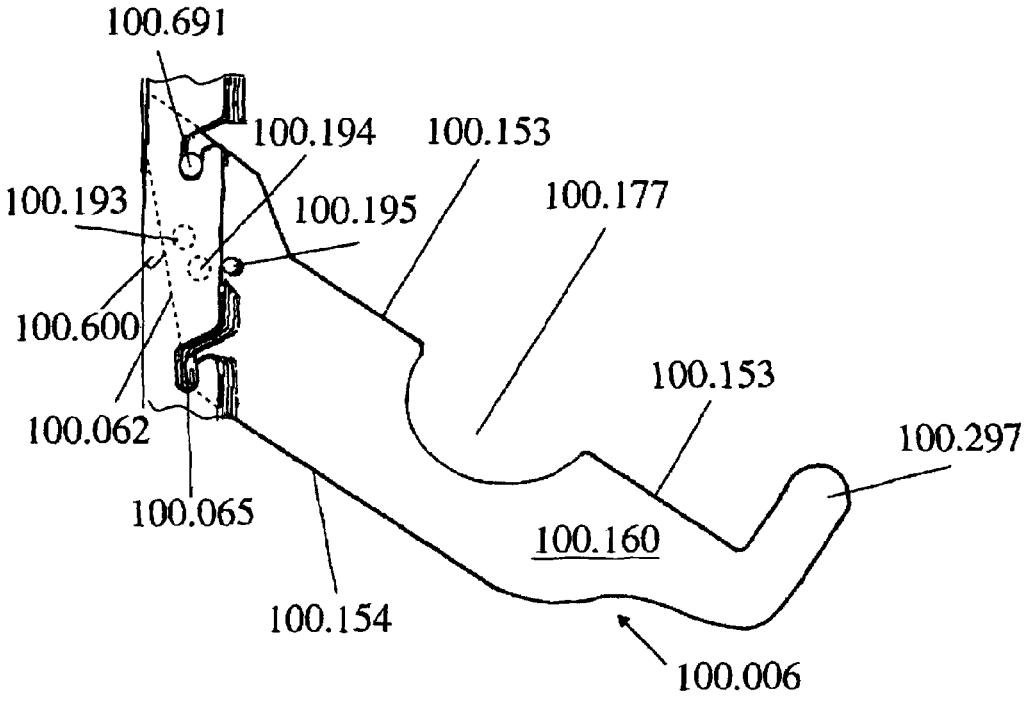

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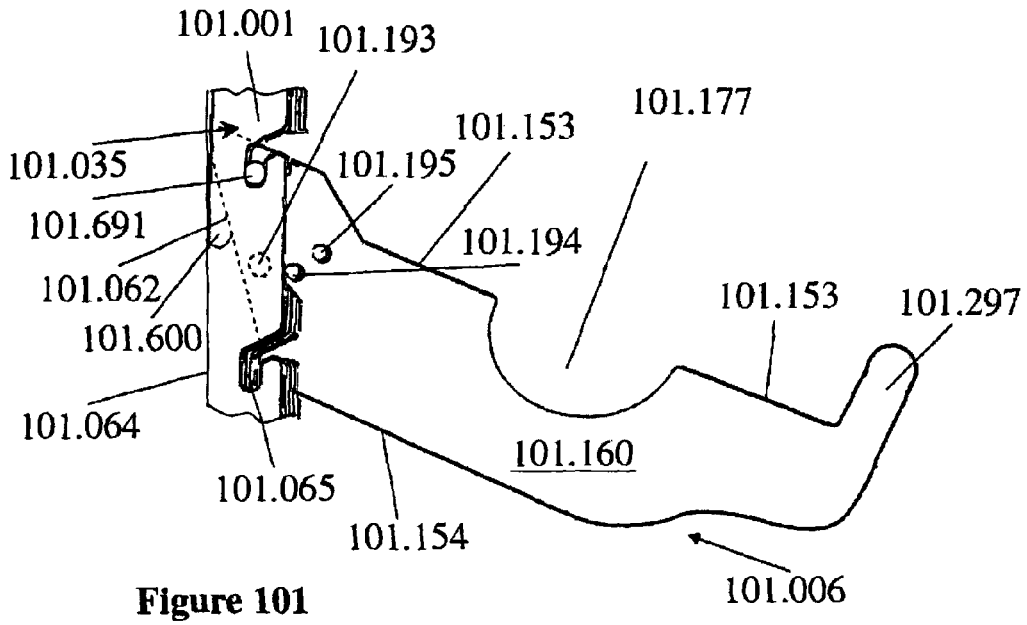

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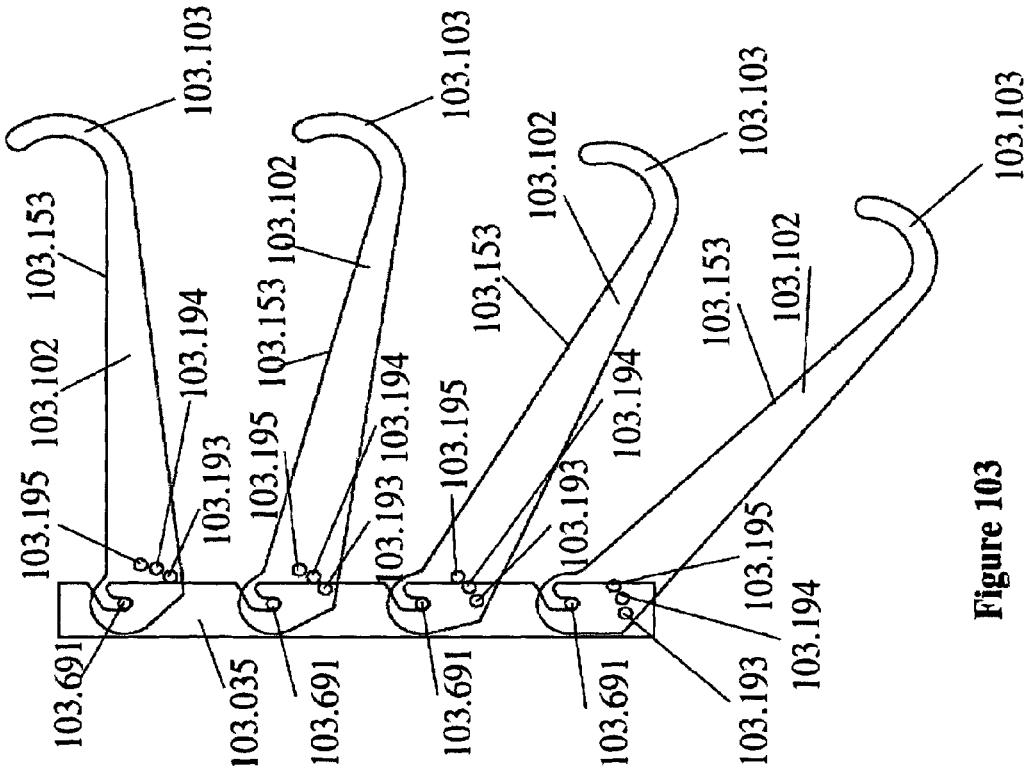

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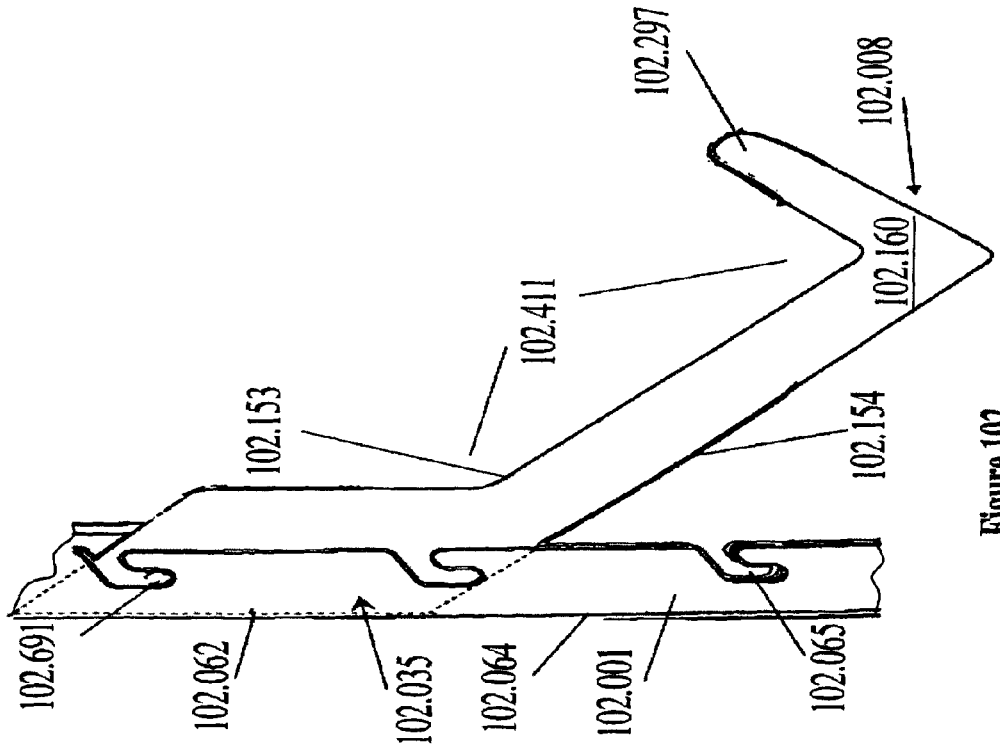

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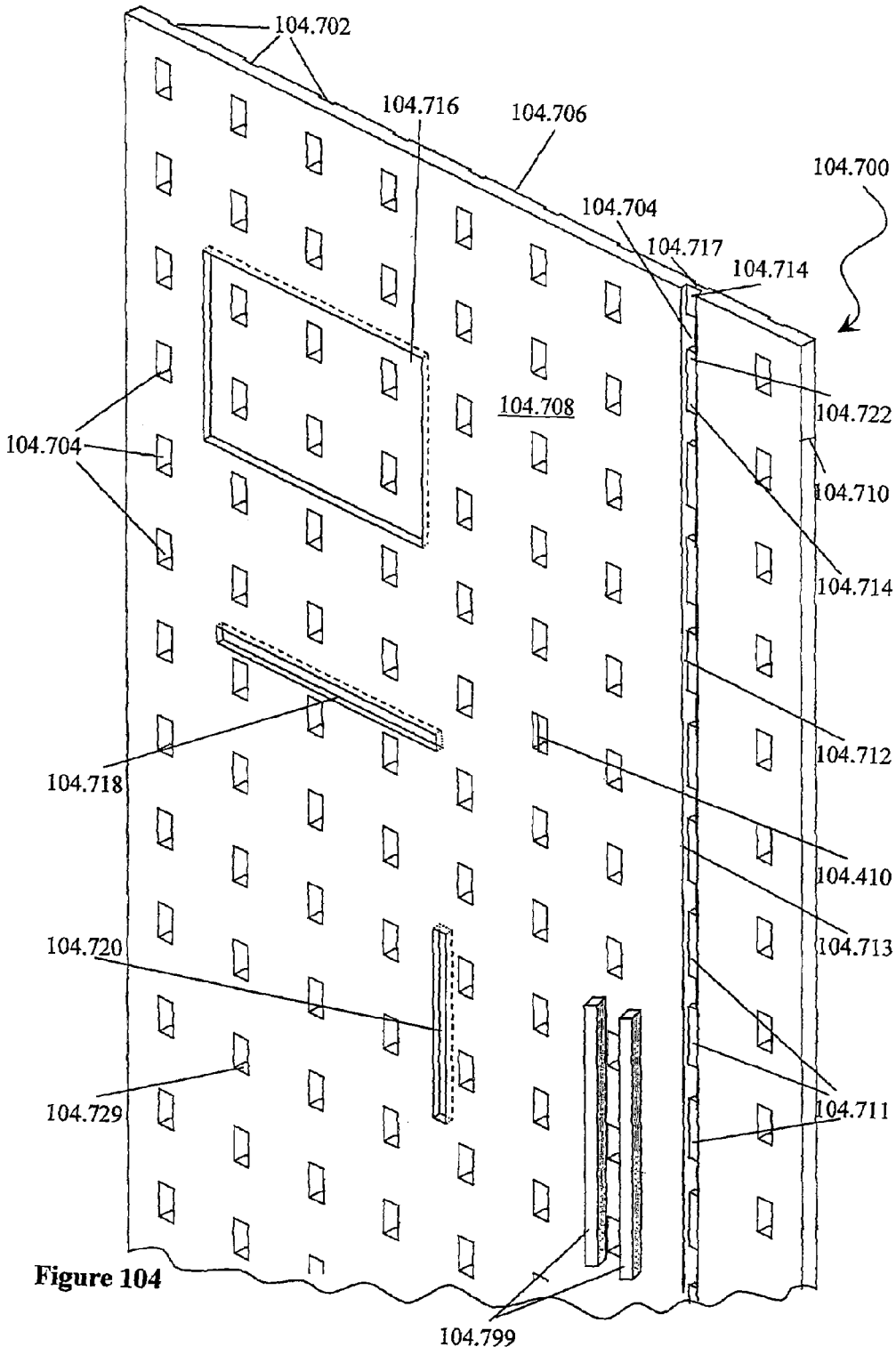
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Figure 104

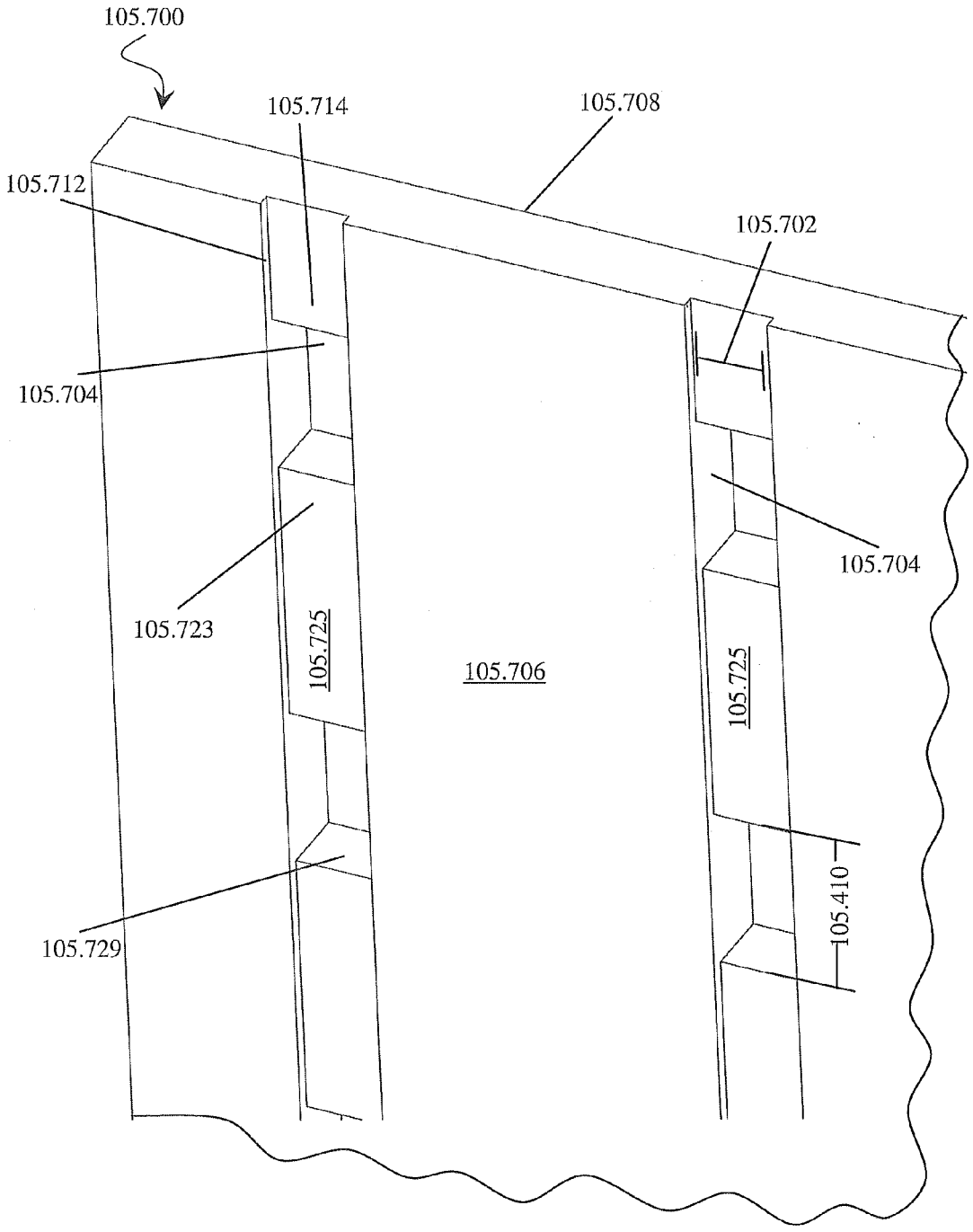
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Figure 105

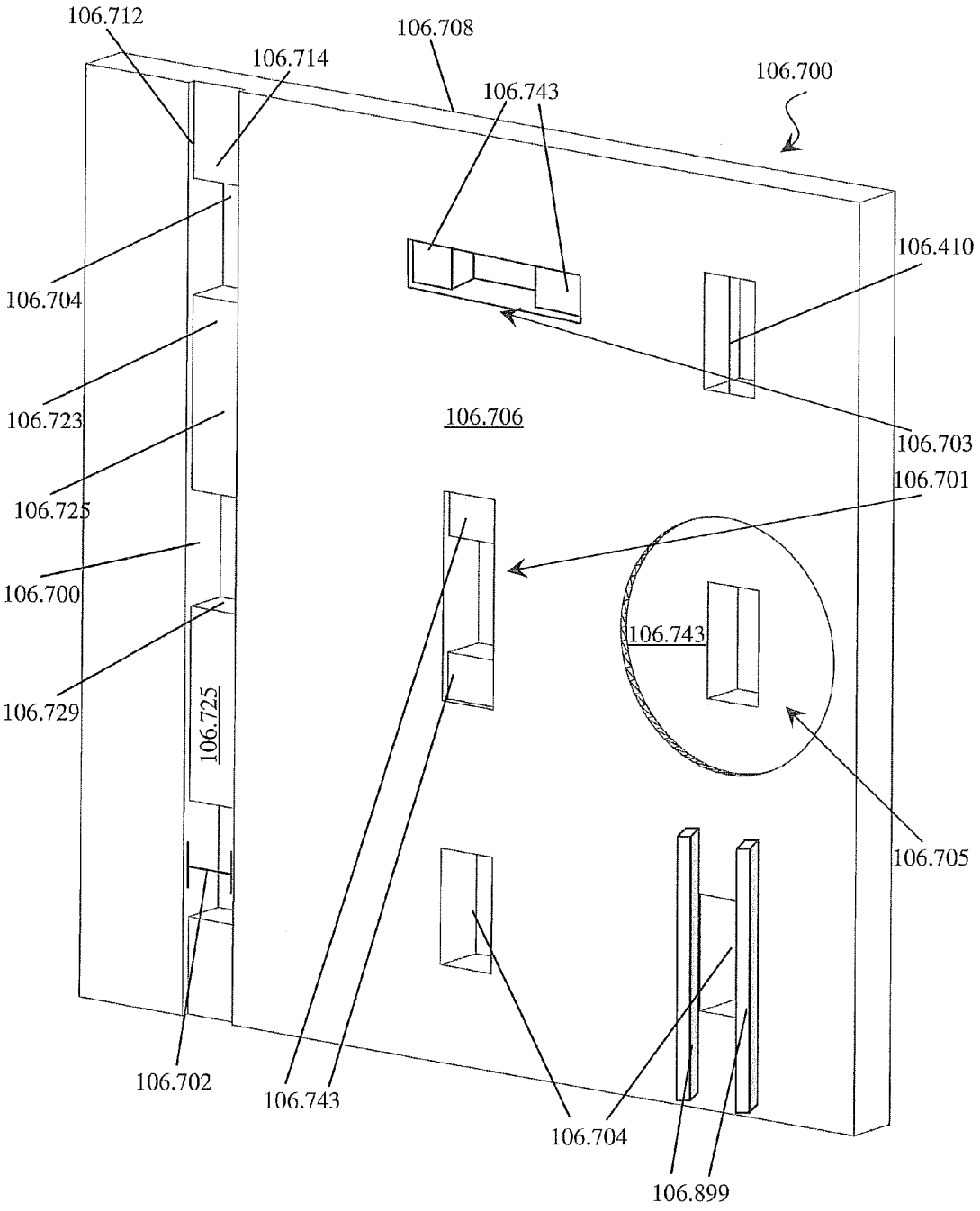
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Figure 106

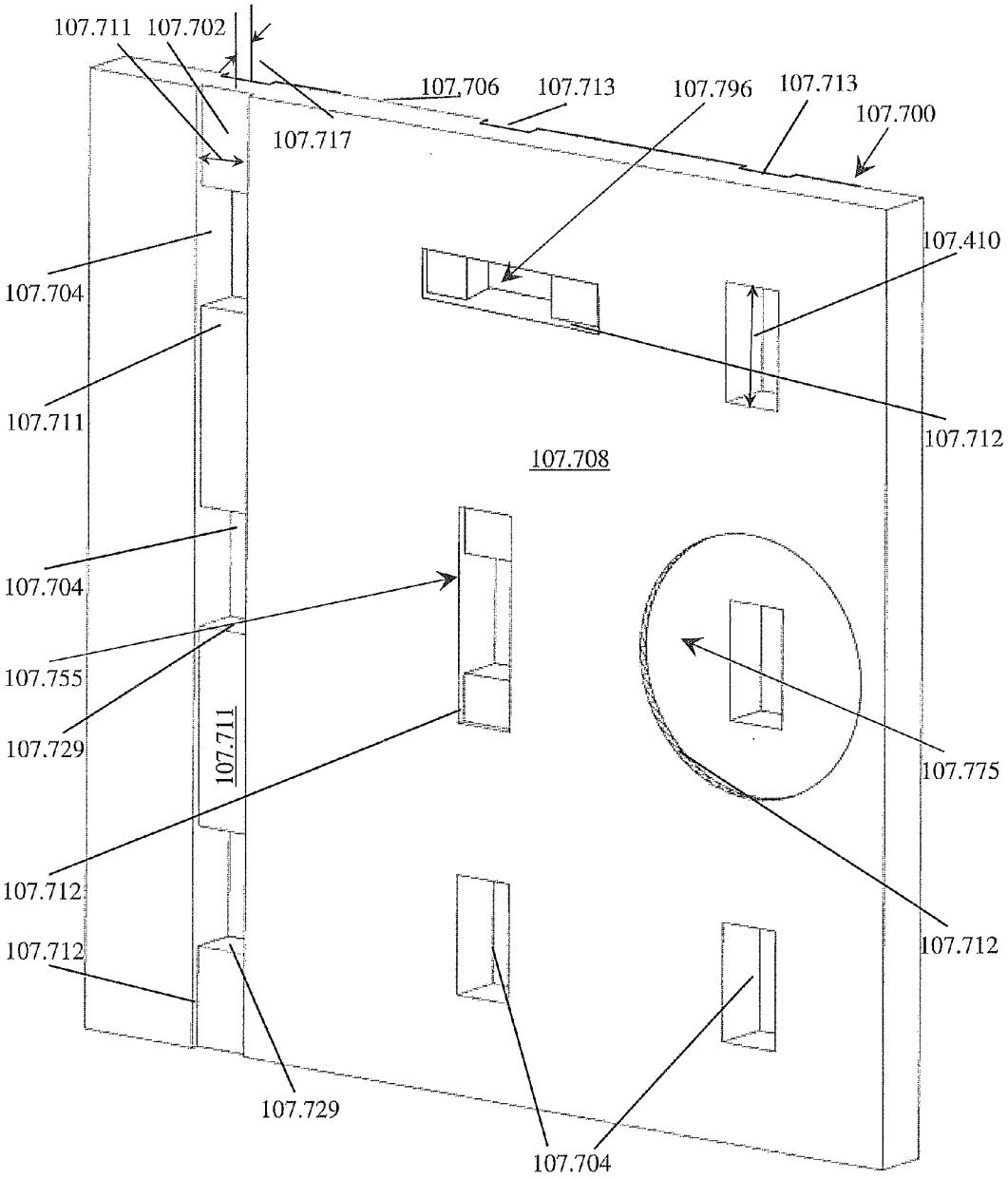
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Figure 107

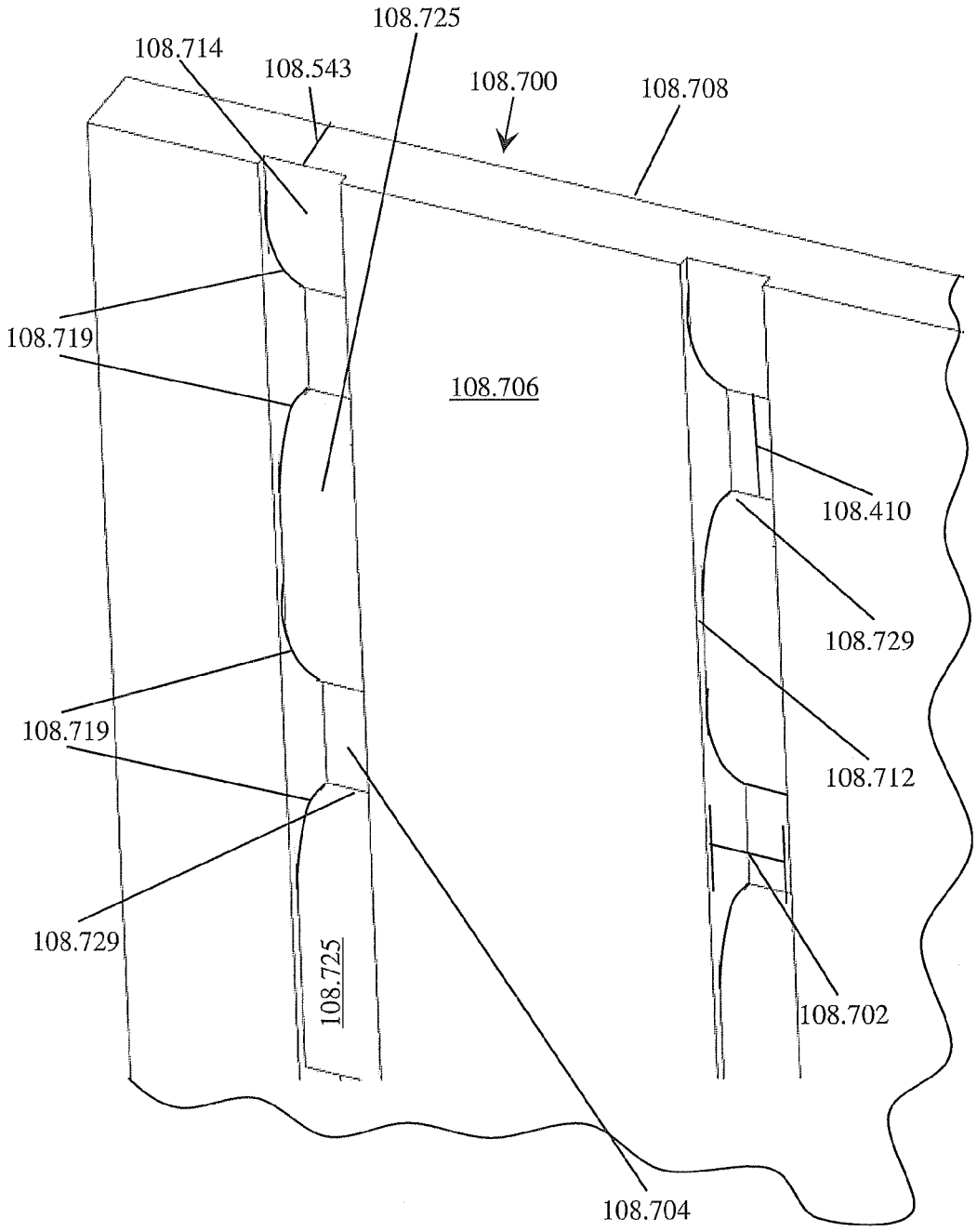
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Figure 108

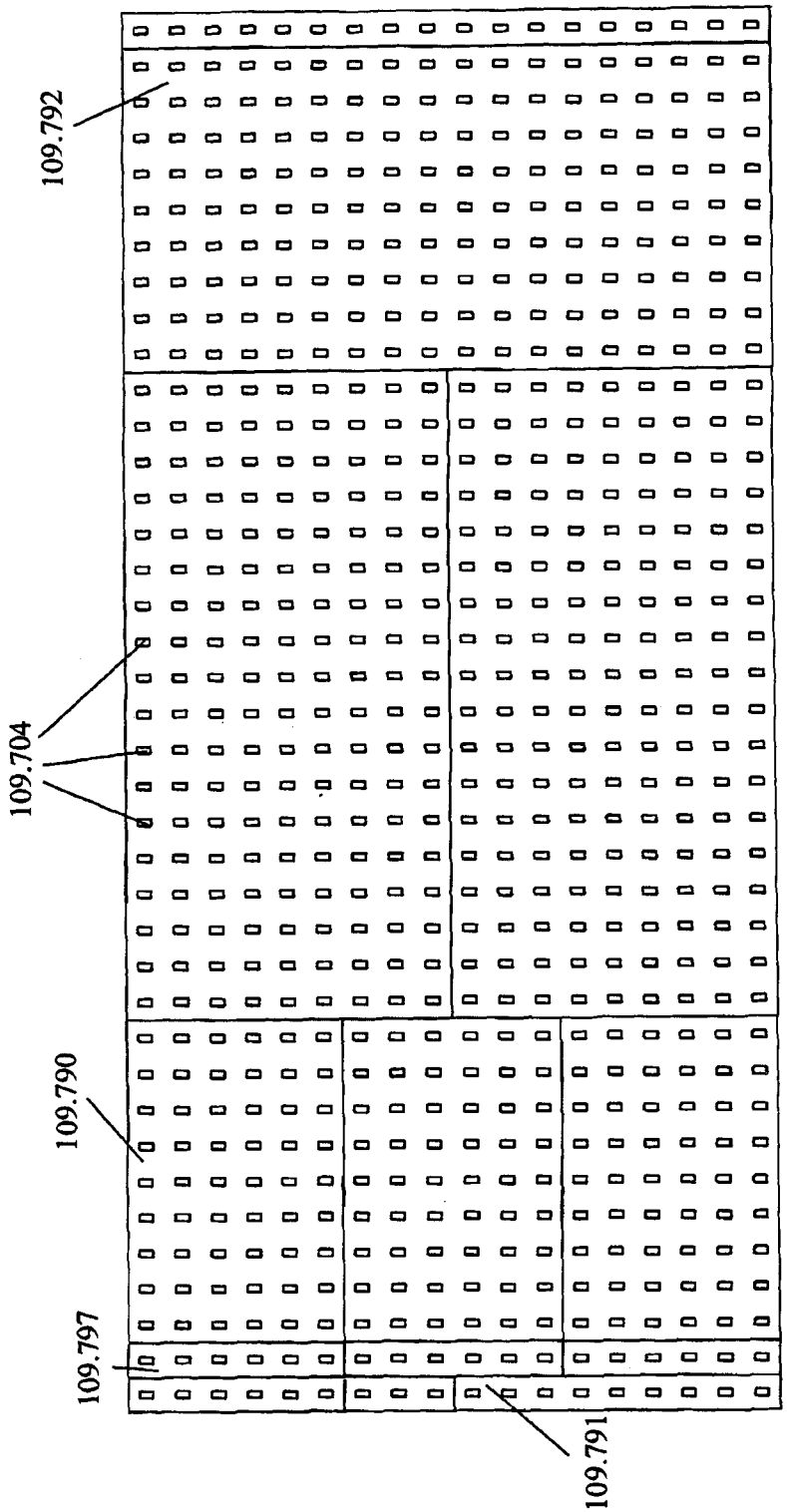

Figure 109

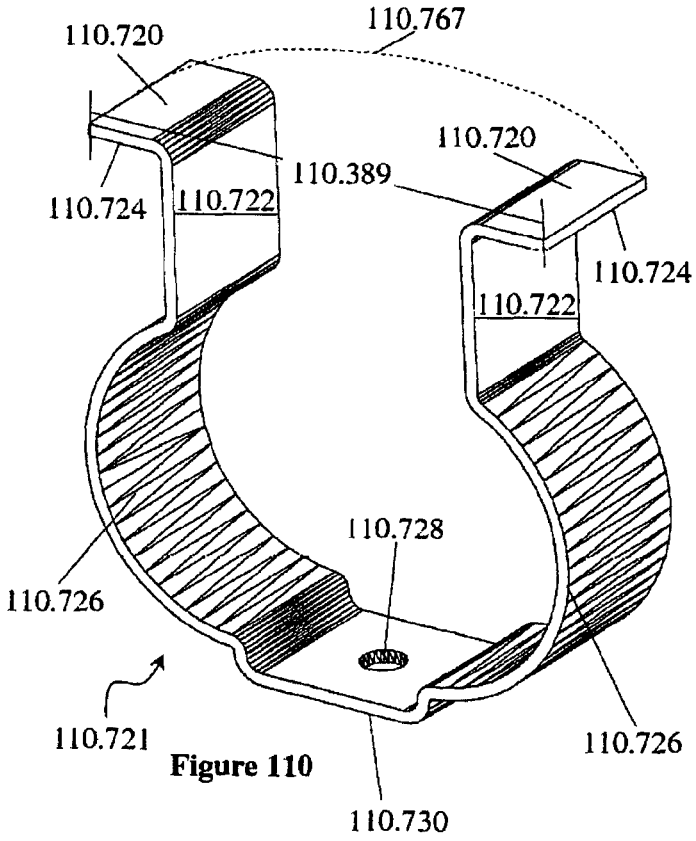

Figure 110

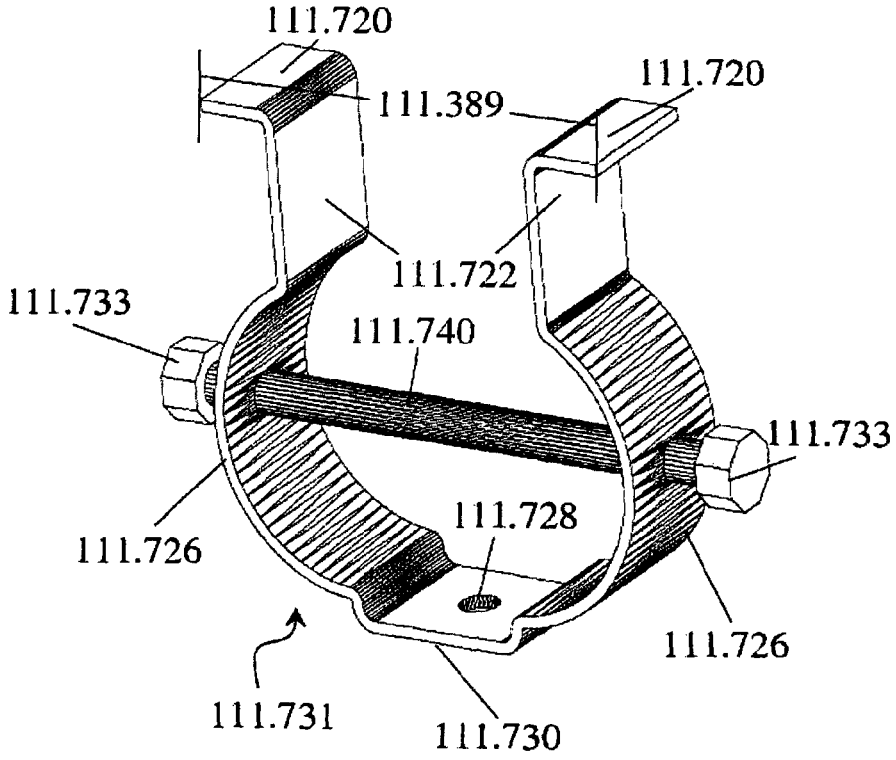

Figure 111

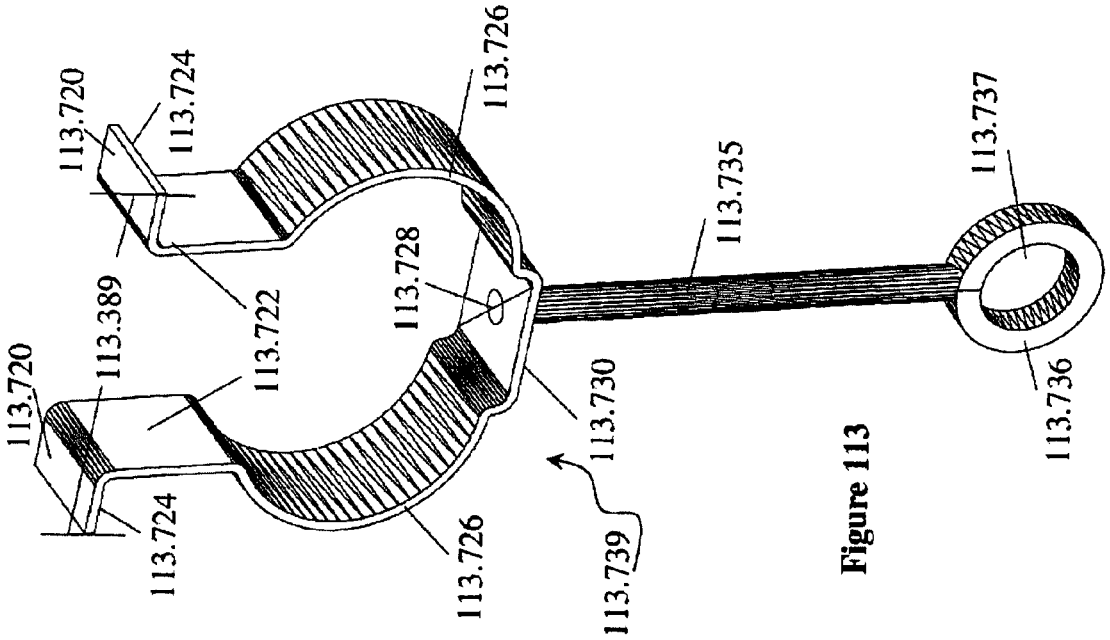

Figure 113

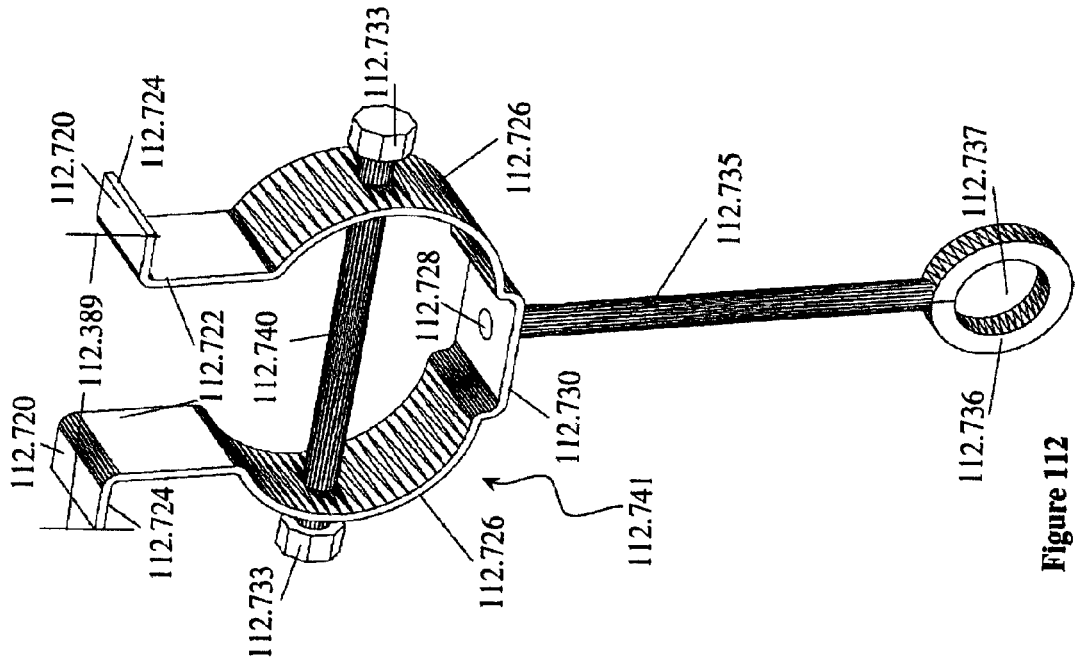

Figure 112

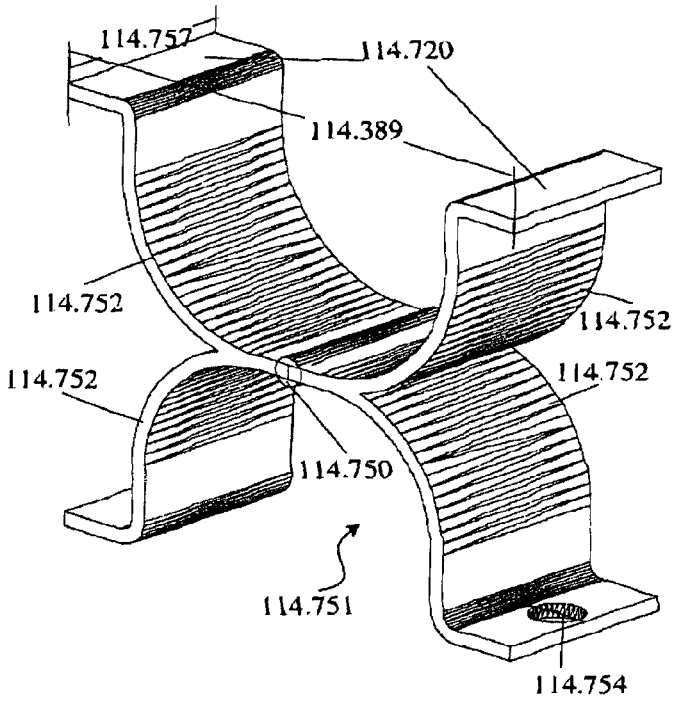

Figure 114

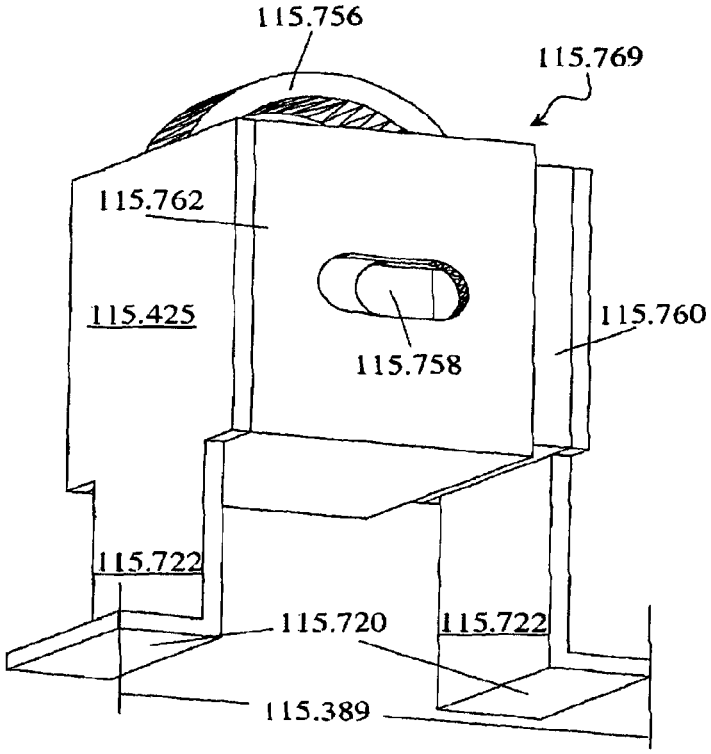

Figure 115

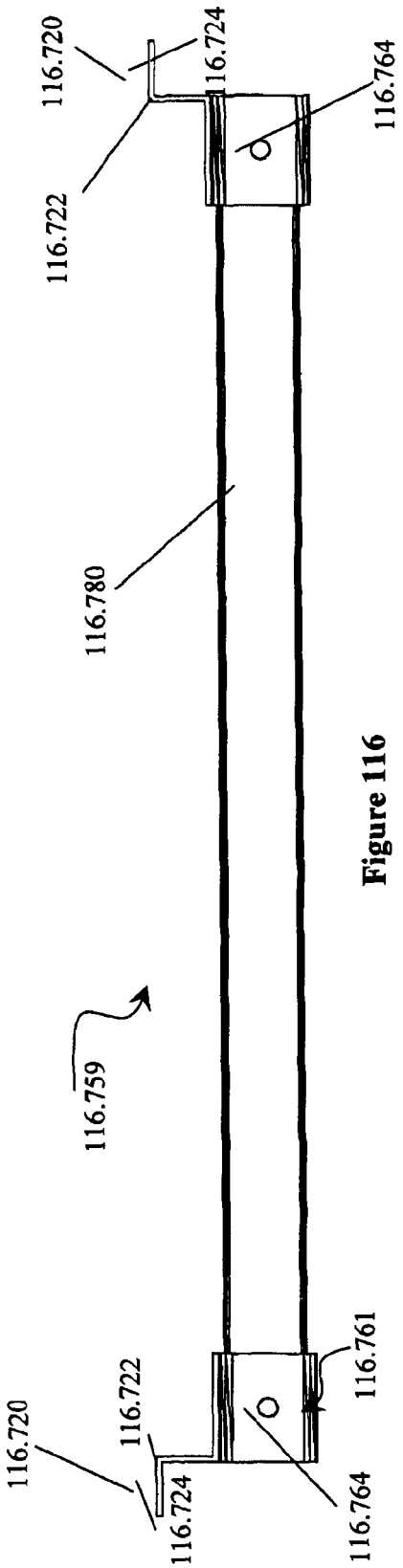

Figure 116

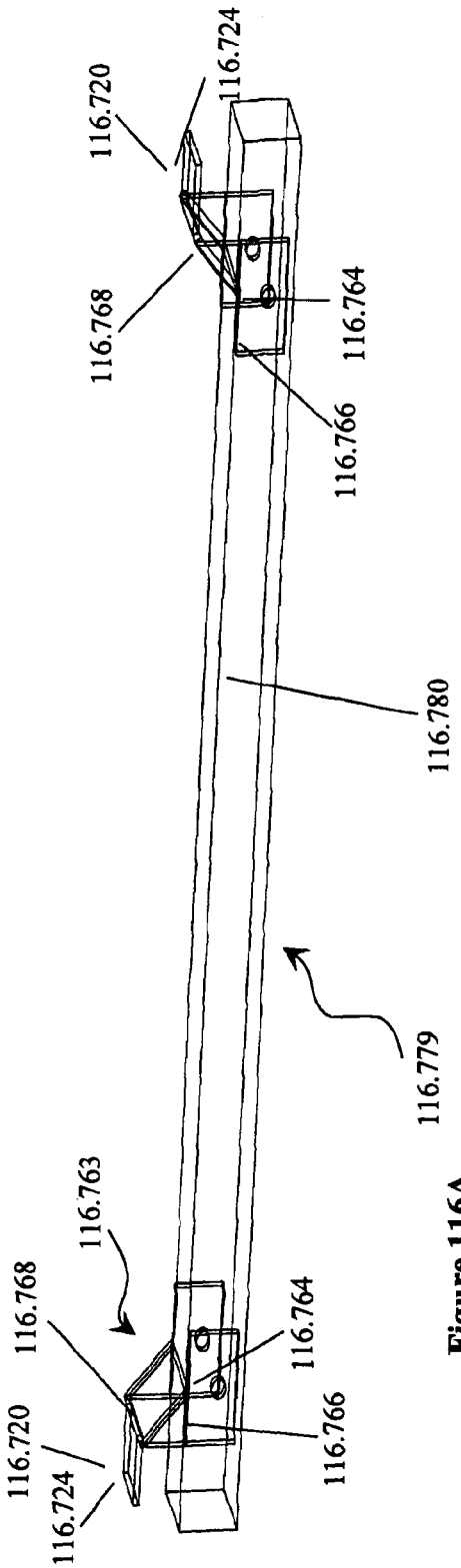

Figure 116A

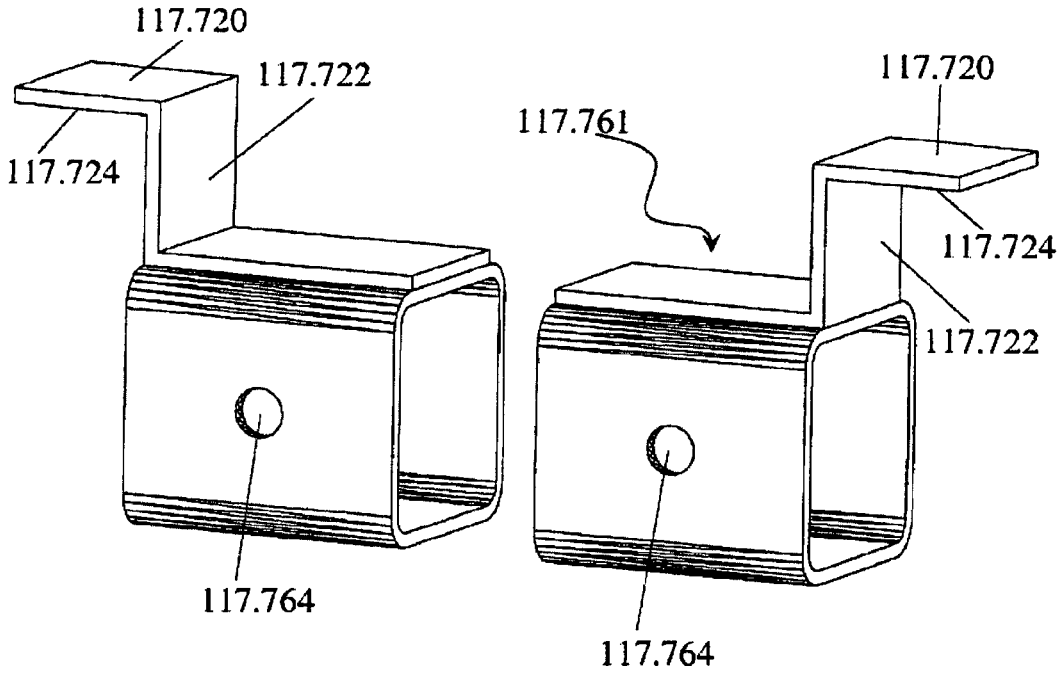

Figure 117

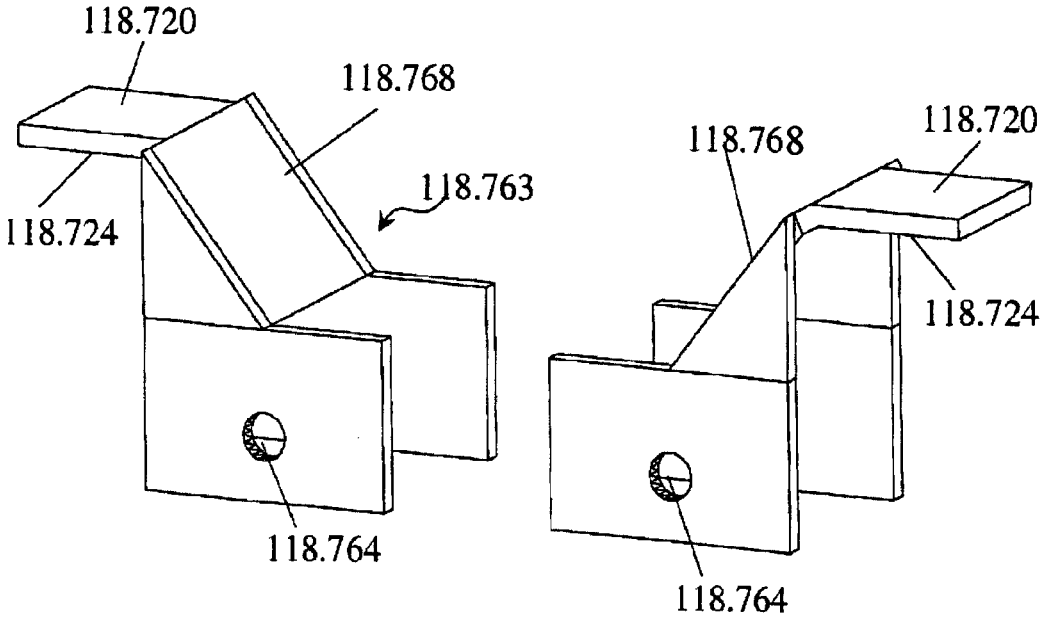

Figure 118

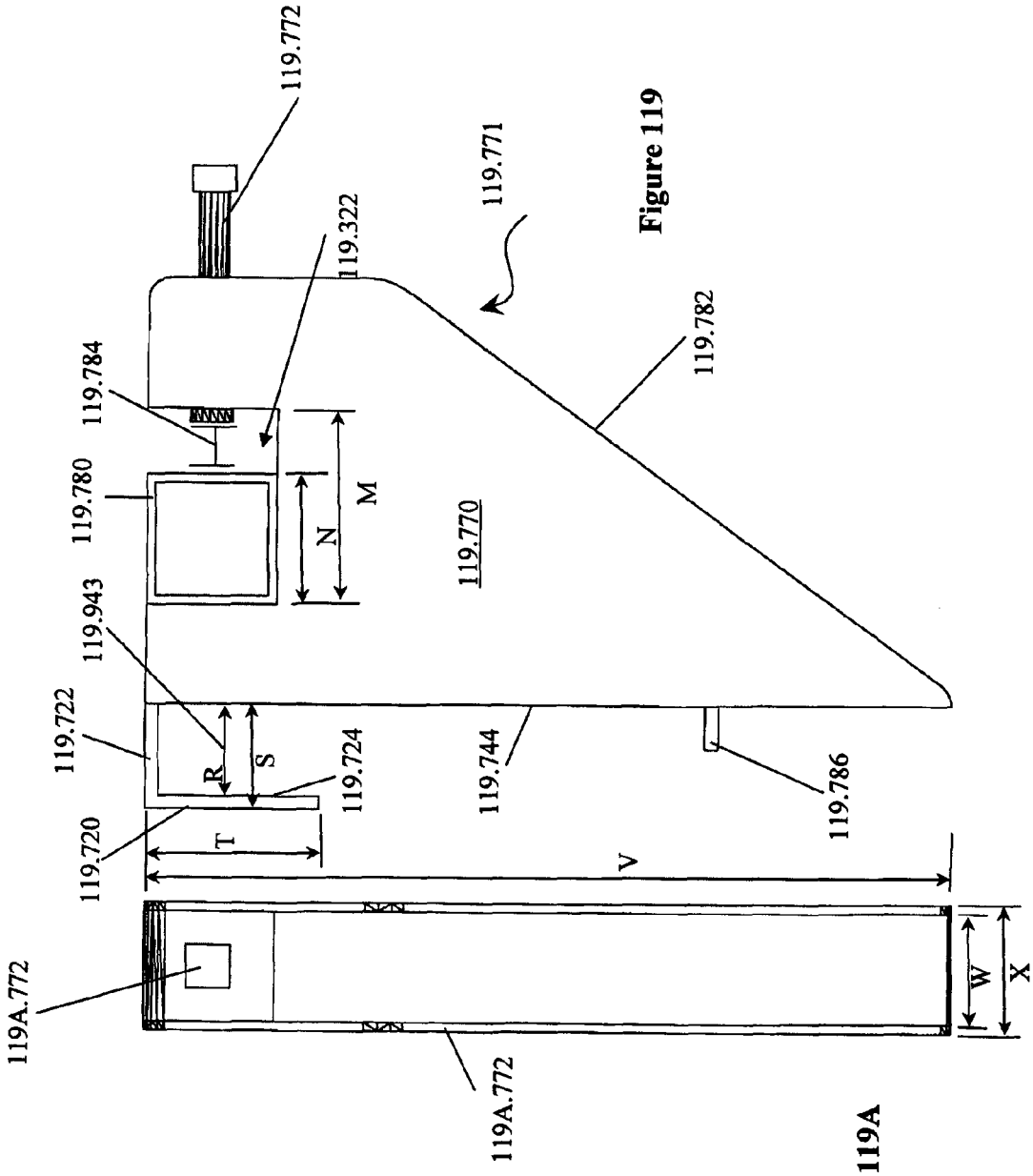

Figure 119

Figure 119A

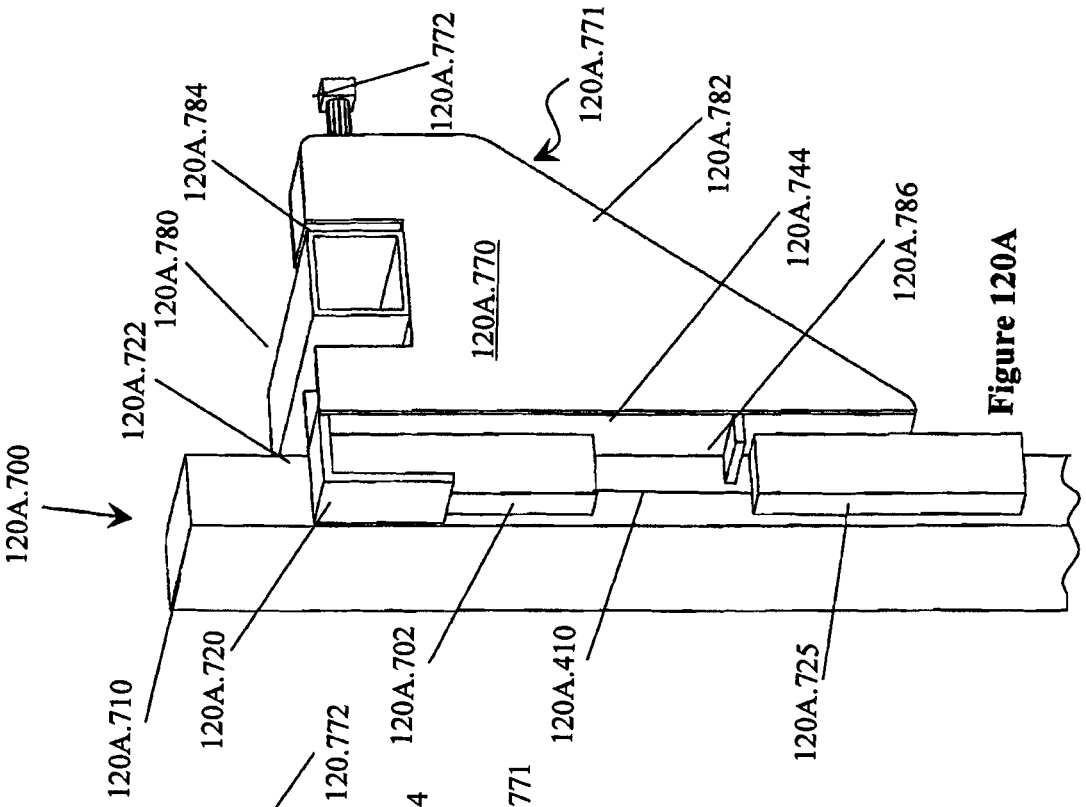

Figure 120A

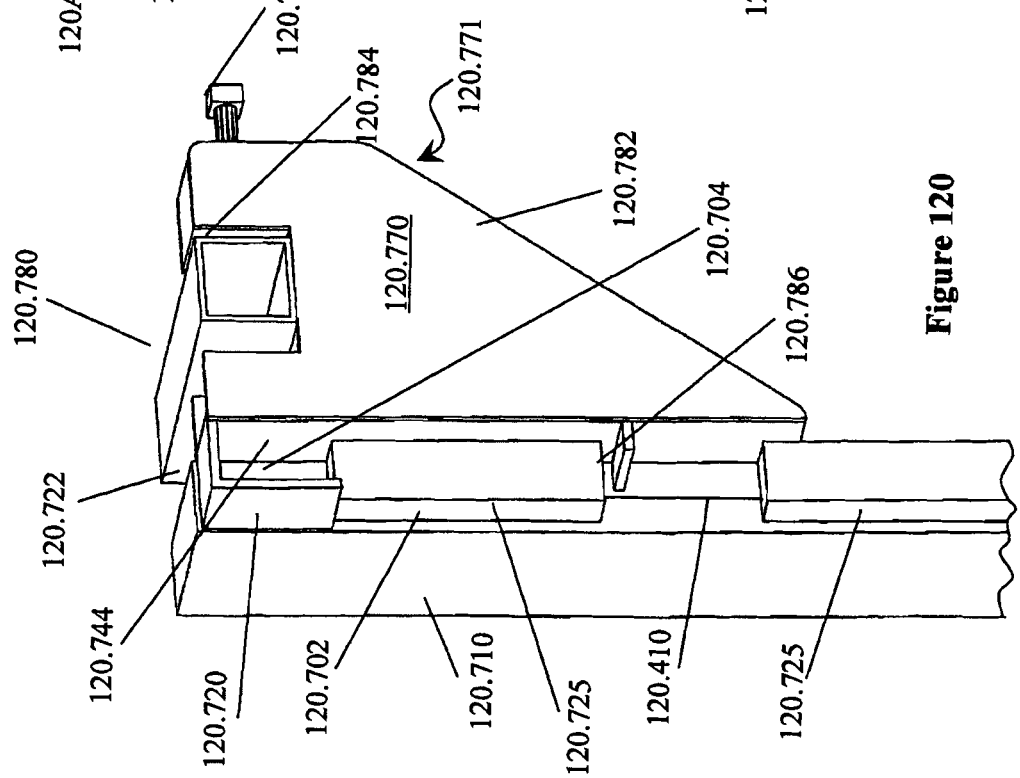

Figure 120

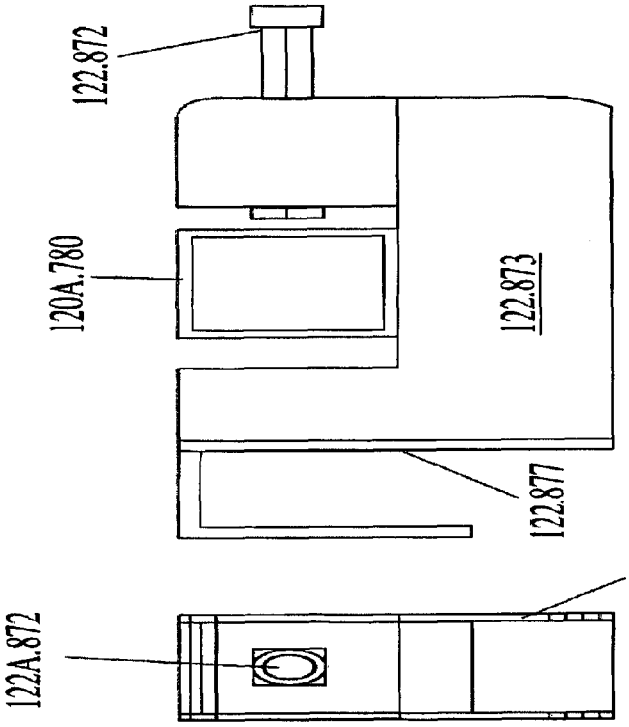

Figure 122

Figure 122A

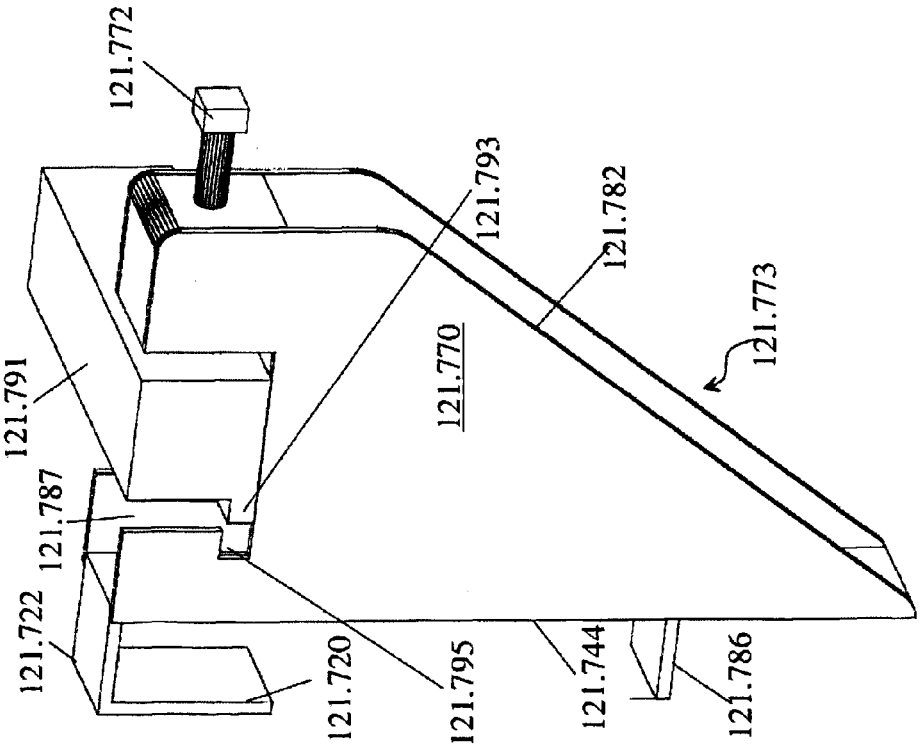

Figure 121

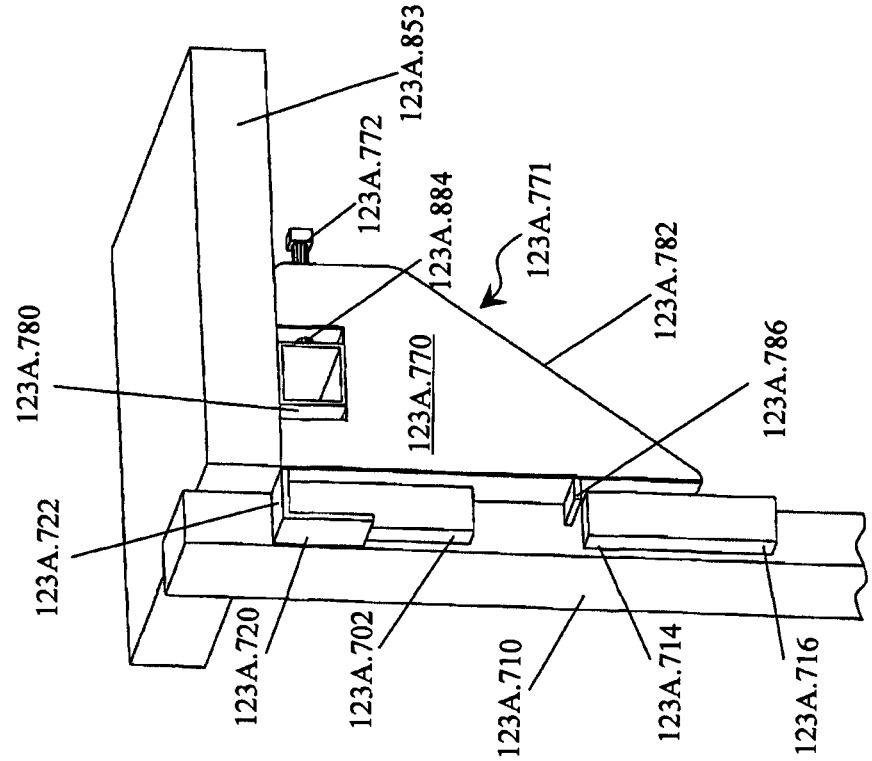

Figure 123A

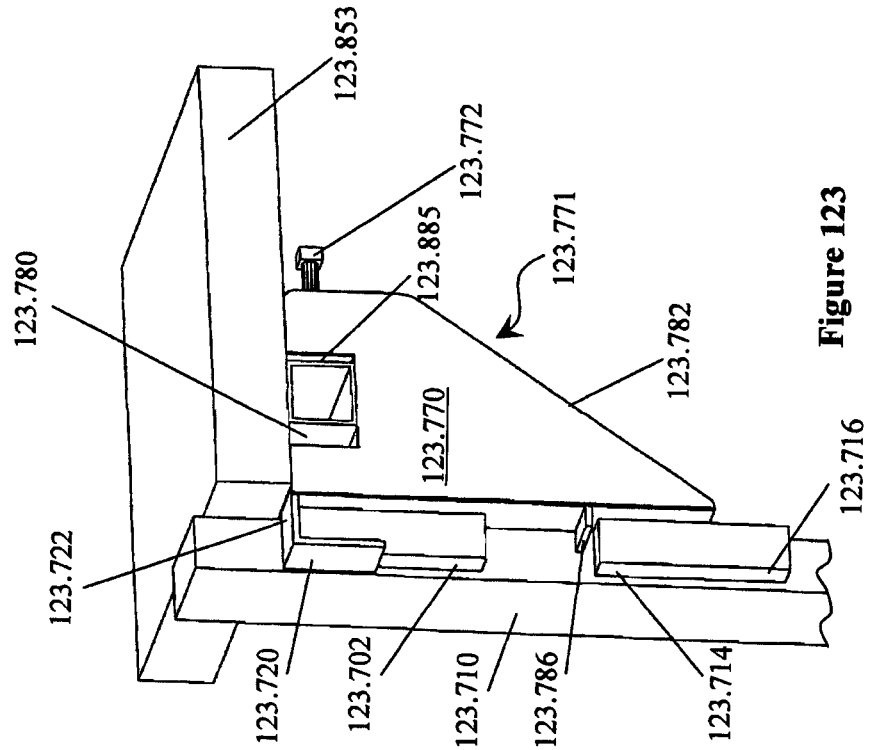

Figure 123

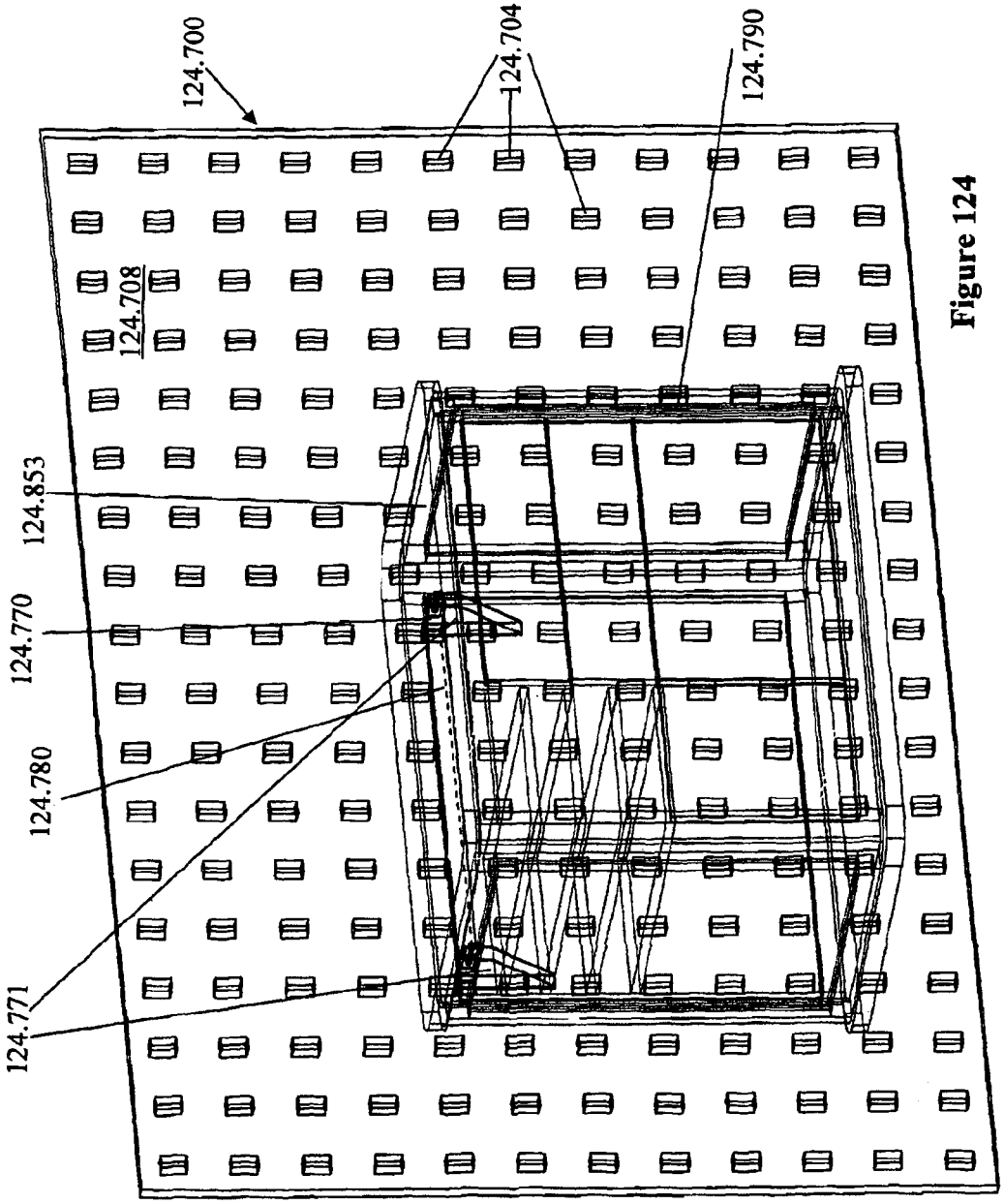

Figure 124

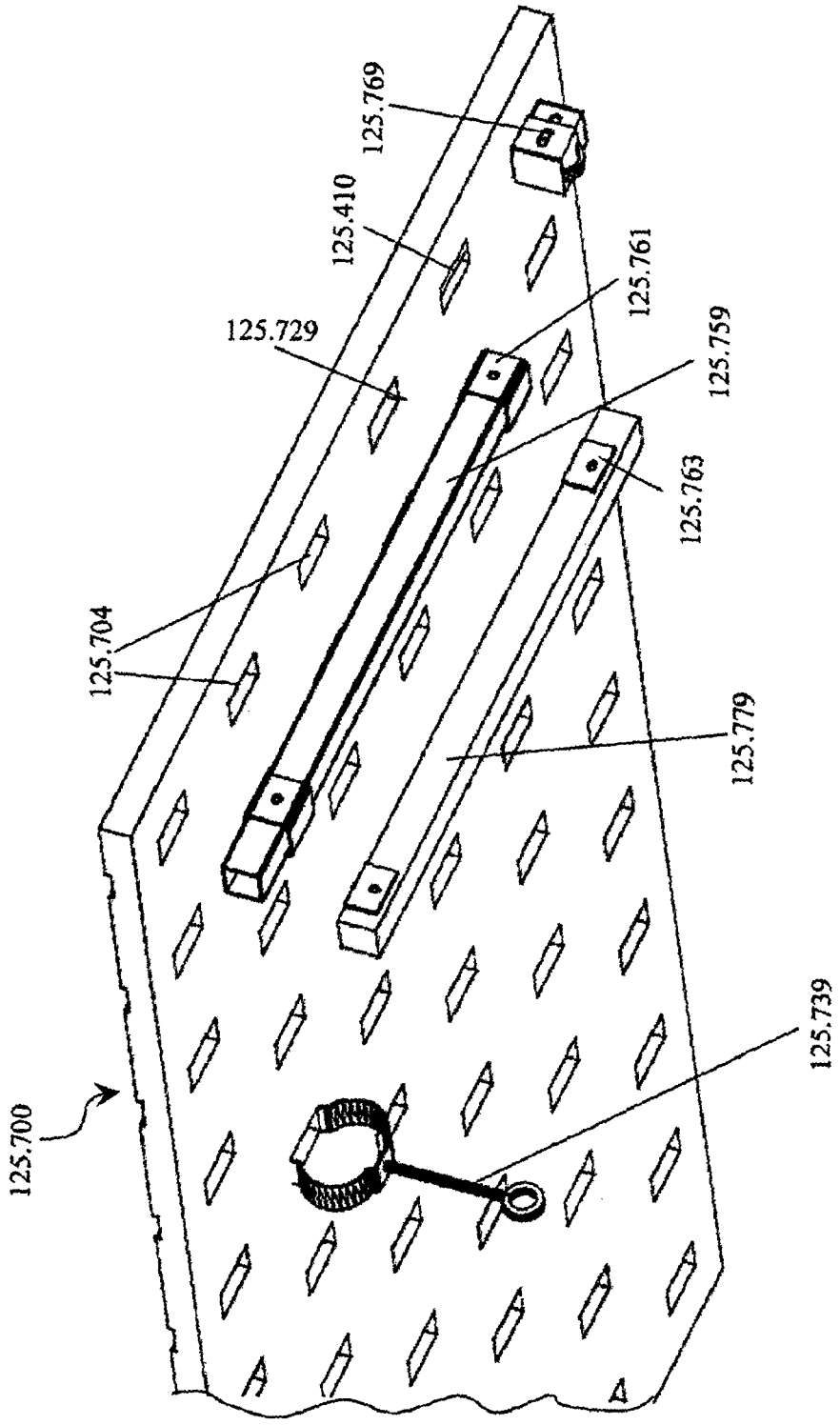
125.769
125.410
125.761
125.729
125.759
125.763
125.704
125.779
125.739
125.700

Figure 125

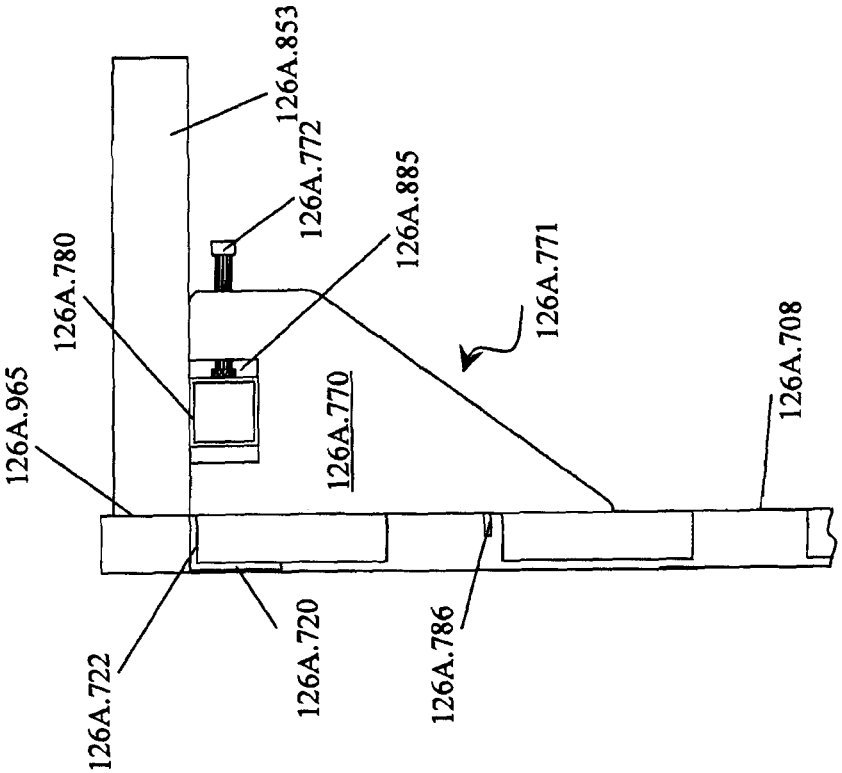

Figure 126A

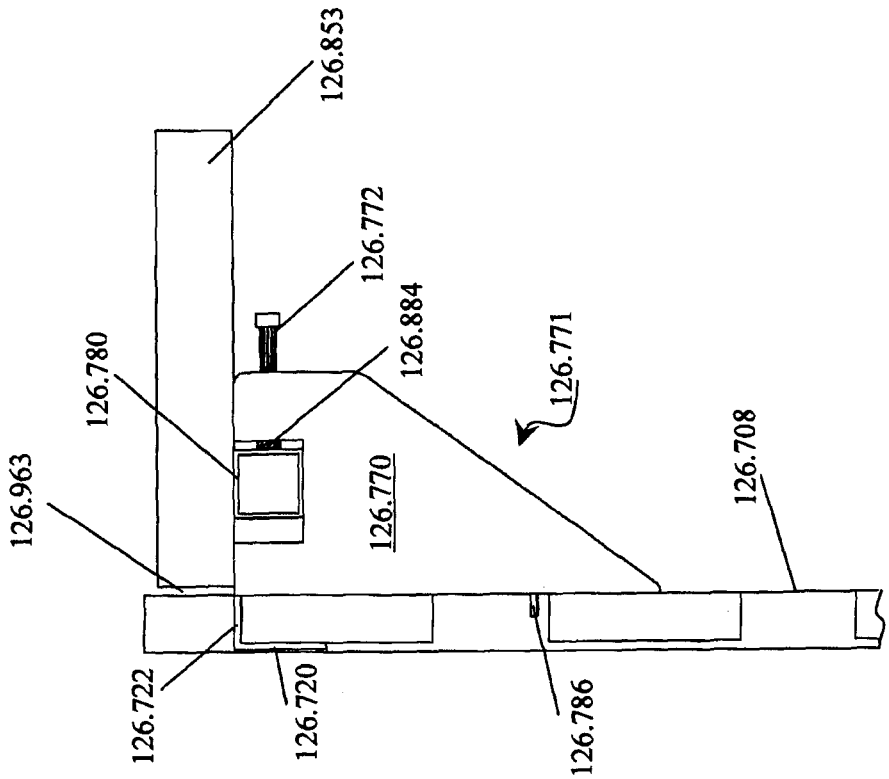

Figure 126

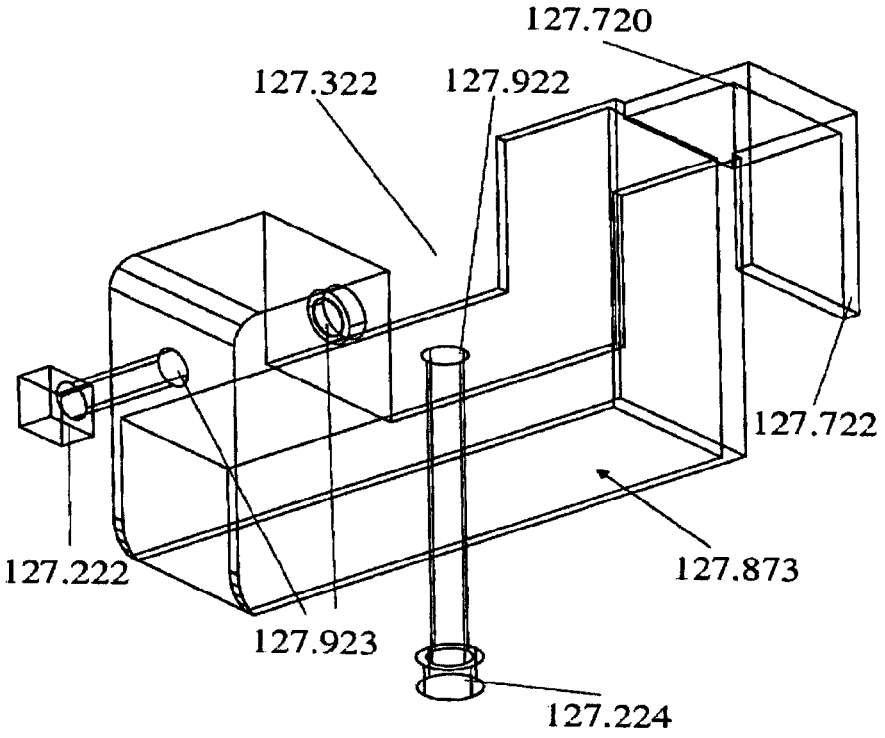

Figure 127

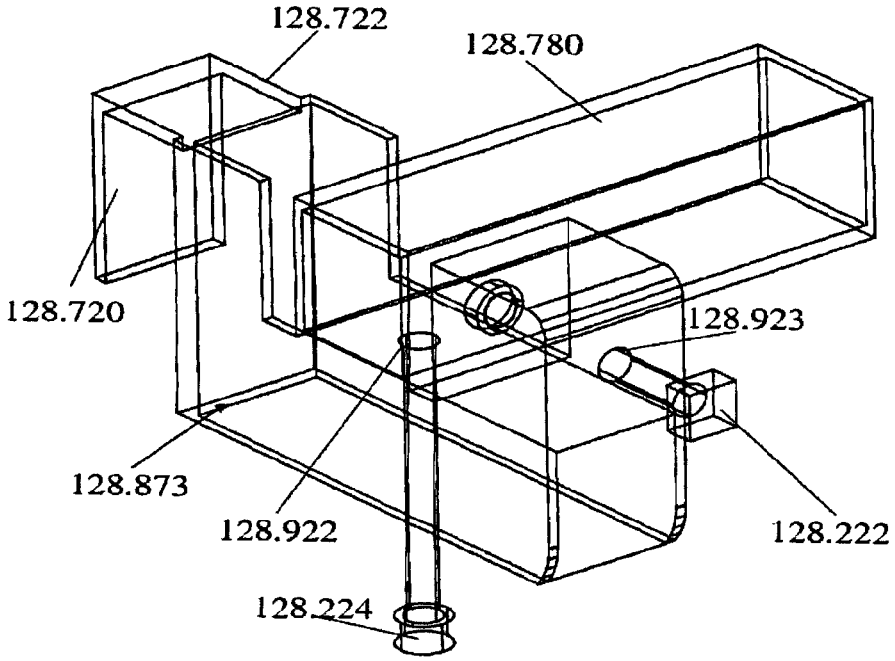

Figure 128

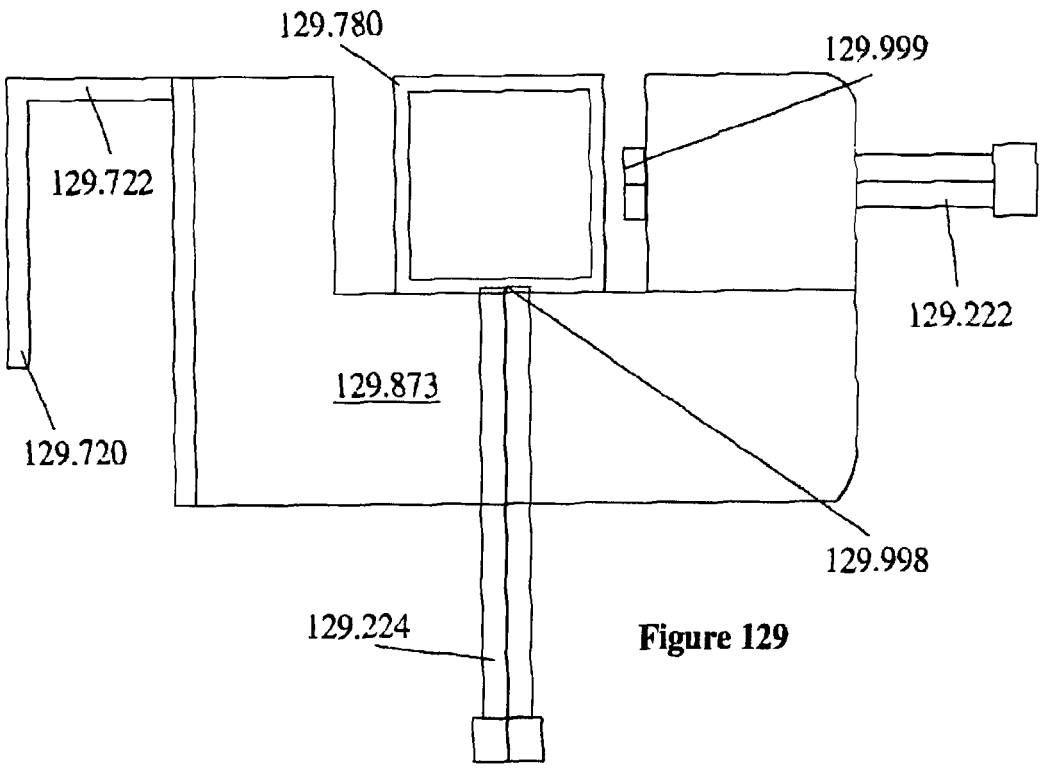

Figure 129

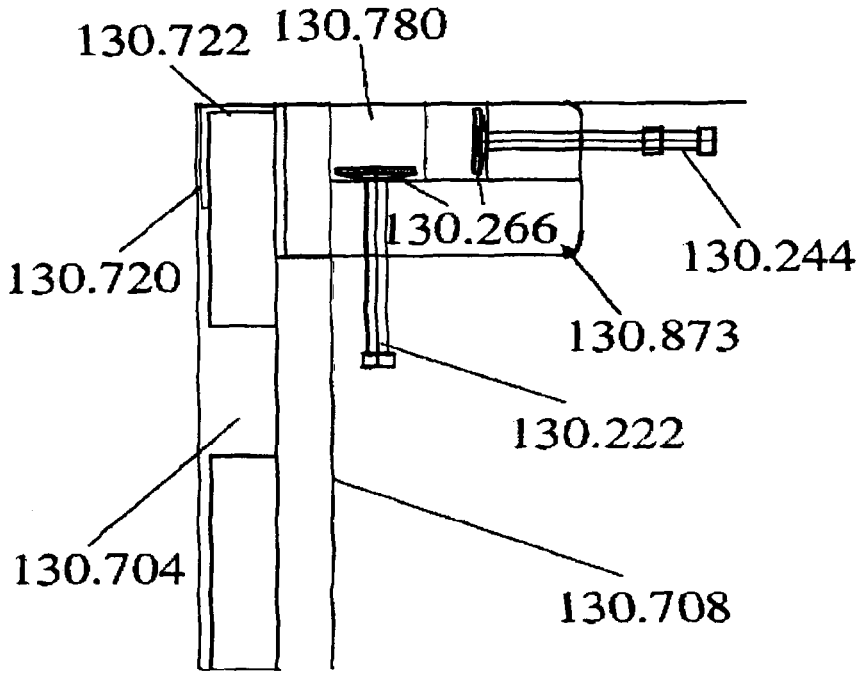

Figure 130

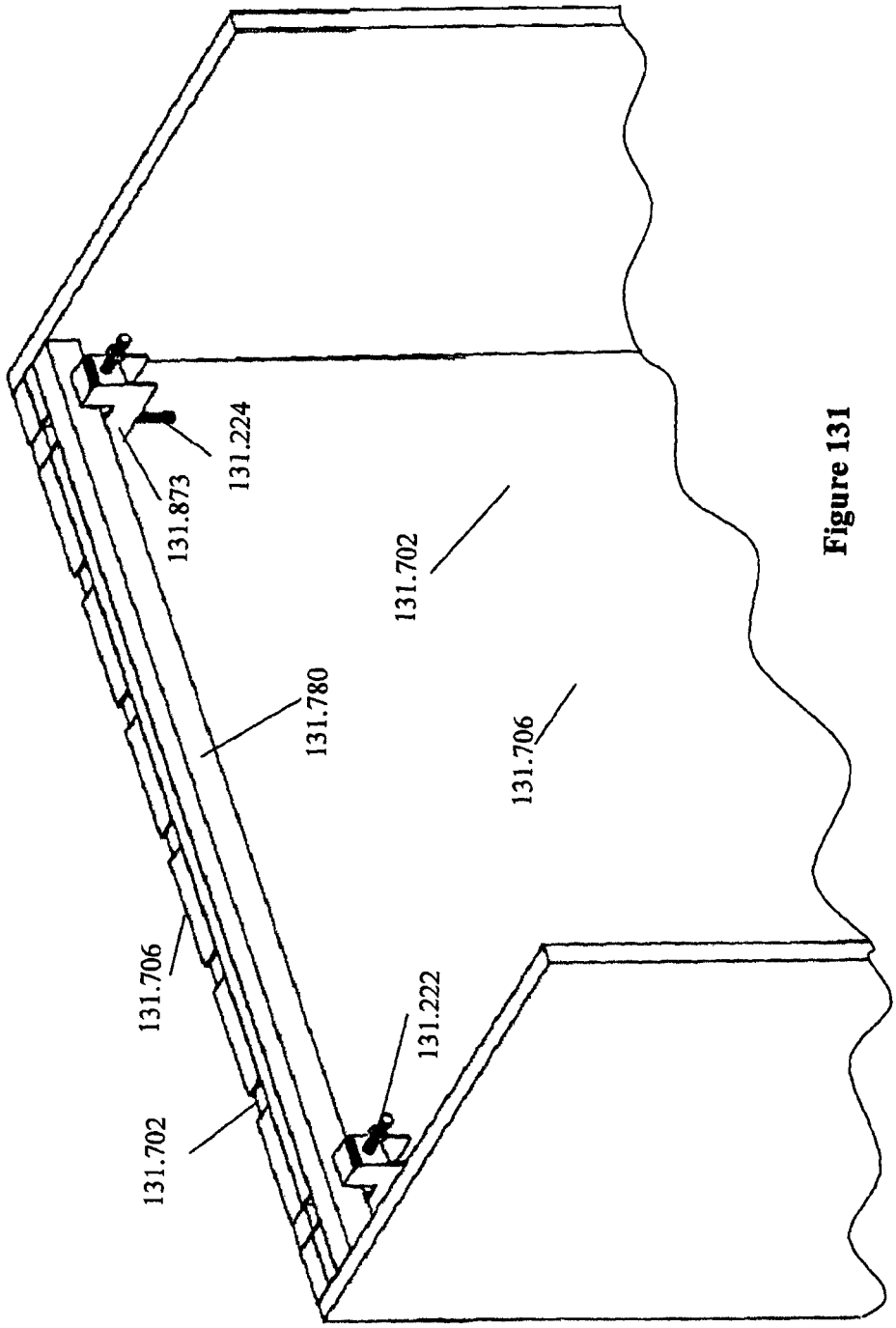

Figure 131

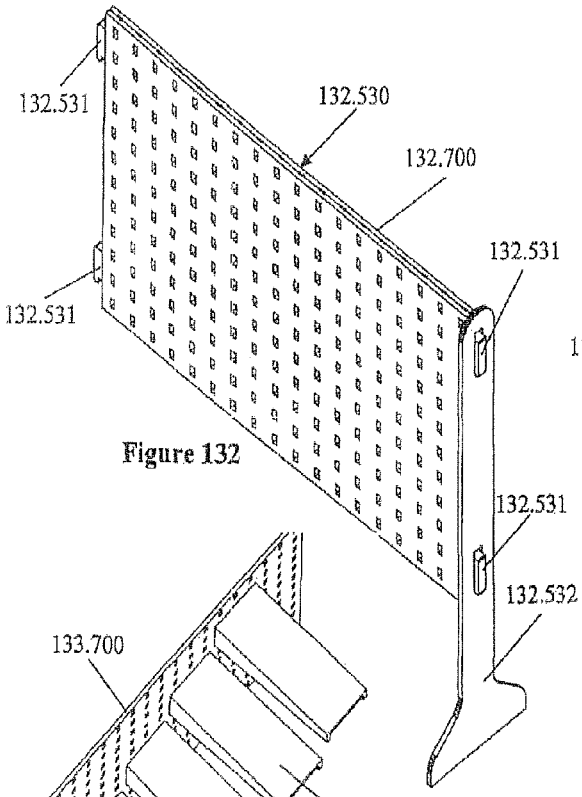

Figure 132

Figure 133

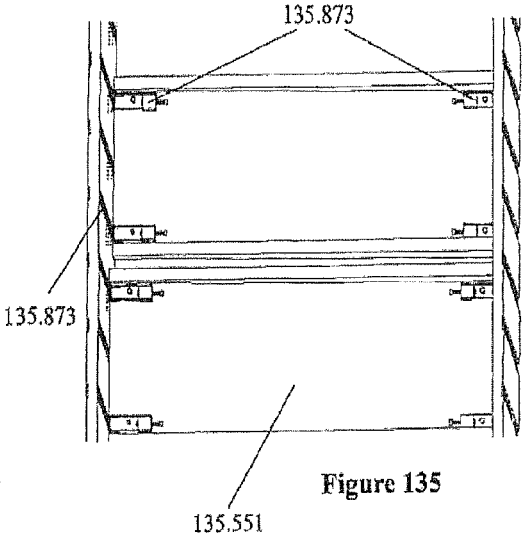

Figure 135

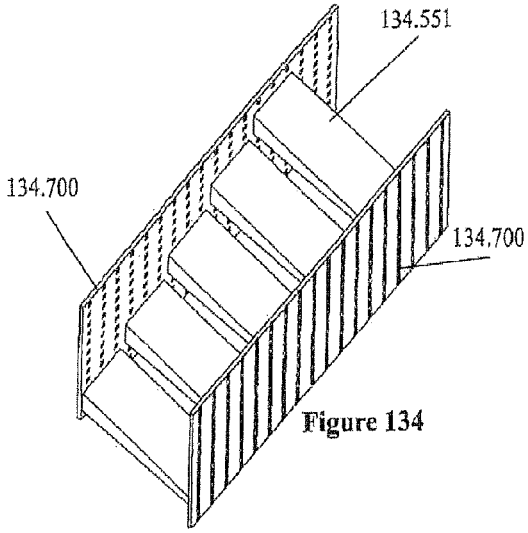

Figure 134

RACK SYSTEM AND BRACKET

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from PCT Appl. No. PCT/AU/2011/000268 filed on Mar. 10, 2011, AU 2010900999 filed on Mar. 10, 2010, Australian Patent Appl. No. 2010902611 filed on Jun. 15, 2010, and Australian Patent Appl. No. 2010904997 filed on Nov. 10, 2010, all of which are hereby incorporated by reference in their entireties.

FIELD OF THE INVENTION

The present invention relates to racking systems that involve the cantilevering of support brackets and brackets that can be mounted to a wall or be free standing.

BACKGROUND OF THE INVENTION

There has been a long felt need for a racking system for use with marine and other sporting equipment, in the hardware industry, general building industry and in garden centres which provides flexibility of application and rearrangement of the components to suit a variety of items to be stored.

Any reference herein to known prior art does not, unless the contrary indication appears, constitute an admission that such prior art is commonly known by those skilled in the art to which the invention relates, at the priority date of this application.

SUMMARY OF THE INVENTION

The present invention provides a support member including a body, at least one arm or hook extending away from the body that can be inserted through an aperture in a support means, the at least one arm or hook including an end portion which is adapted to be received into a recess on a rear surface of the support means.

The support member can include a recess to receive a structural member.

The structural member can have a formation which engages a portion of the recess to prevent movement in a disassembling direction.

The support member can include: two arms or hooks; two arms or hooks to respectively pass into two separate apertures in the support means; one arm or hook and a stabilising projection; one arm or hook and a stabilising projection to respectively pass into two separate apertures in the support means.

Means can be provided to do one or more than one of the following: secure the location of the structural member onto the support members; secure the location of an article attached to the structural member with respect to the panel; secure the support member to the panel.

The structural member can be one of a beam; a bracket; a beam or bracket or other part of or attached to one of the following: furniture; a cabinet; a vanity cabinet; a cupboard; a shelf; a dressing table; a seat; a chest of drawers; a chair; a work bench; a building element; a stair tread; a beam; an art work; electrical switch boards; electrical cabinets; television set; computer racks or any appropriate article.

The support member can include two arms or hooks which can move towards each other so that the arms or hooks can pass through the aperture of the support means.

The support member can further include one or more of the following: a securing member passing through the arms or hooks to move the arms or hooks relative to each other; a first arm or hook is provided on a first portion being insertable into a second portion on which is provided a second arm or hook, and wherein the first and second portions are adapted to move with respect to each other; the support member includes two arms or hooks, which are pivoted with respect to each other; a tubular portion to receive a structural member such as a beam; a support to receive a bracket; the at least one arm or hook include outwardly radiused or curved regions.

The support member can include means to move or secure the structural member and has one or more of the following: provides for movement or securement in a horizontal direction; provides movement or securement in a vertical direction; provides movement or securement in both a vertical direction or a horizontal direction; is able to be locked.

The at least one arm or hook and or the end portion can engages one or more walls of the recess to thereby resist twisting forces applied to the support member.

The support member can include a portion which will engage a recess or channel on a front surface of the panel.

The support member can be formed from one or more of the following: fabricated from side plates; cast steel; composite materials; aluminium; in a generally rectangular format; in a generally triangular format; from sheet metals leaves forming the arms or hooks; open box sections; closed box sections; extrusion.

The previously described support member and a support pane can form a system whereby the panel includes a front face and a rear face and at least one aperture extending through the panel between the front face and the rear face; the rear face including a recess adjacent to the aperture, the recess having a base surface which in side view is located between the front face and the rear face,

The base surface can intersect with a wall of the aperture.

The recess can be located relative to the aperture in one of the following locations: on one side of the aperture; on two sides of the aperture; on opposed sides of the aperture; in a line on opposed sides of the aperture; fully surrounds the aperture; in a circle around the aperture.

The recess can be in the form of a rebate, formed as a channel formation having opposed side walls and a base.

The panel can have one or more of the following features: multiple apertures are provided; multiple apertures are provided in an array; multiple apertures are provided such that the recess is formed by a rebate which extends between at least two apertures; the front face can include a recess associated with the at least one aperture which does not intersect with a wall of the aperture or does intersect with a wall of the aperture.

The present invention also provides a support panel having a front face and a rear face and at least one aperture extending through the panel between the front face and the rear face; the rear face including a recess adjacent to the aperture, the recess having a base surface which in side view is located between the front face and the rear face,

The base surface can intersect with a wall of the aperture.

The recess can be one or more of the following: located relative to the aperture in one of the following locations: on one side of the aperture; on two sides of the aperture; on opposed sides of the aperture; in a line on opposed sides of the aperture; fully surrounds the aperture; in a circle around the aperture; recess is in the form of a rebate, formed as a channel formation having opposed side walls and a base.

The panel can have one or more of the following features: multiple apertures are provided; multiple apertures are provided in an array; multiple apertures are provided such that the recess is formed by a rebate which extends between at

least two apertures; the front face can include a recess associated with the at least one aperture which does not intersect with a wall of the aperture or does intersect with a wall of the aperture.

The present invention further provides a racking system for supporting objects, the system including at least one support flange having at least one slot adapted to receive a bracket support and a bracket connected to or engageable with the bracket support, whereby the bracket extends away from the support flange and or the bracket support.

During assembly the bracket support can first engage at least one support flange and then the bracket engages the bracket support.

The bracket support can be a pin or rod means.

There can be at least two flanges at spaced locations on the bracket support.

Between the at least two flanges the bracket support can have a length equal to the width of the support flange.

The at least two flanges can be at the ends of the bracket support.

The bracket can engage the bracket support between the at least two flanges.

The bracket can have a bifurcated part or includes at least two spaced bracket portions.

The width of space between the bifurcated parts of the bracket, or between the at least two bracket portions, is approximately the same as the width or thickness of the support flange, so that the support flange can be received therebetween.

The bracket can pivot around the bracket support and a portion of the bracket engages a wall means or a support plate to which the support flange is mounted and from which the support flange extends.

The bracket and the support flange and or the bracket support cooperate to provide resistance, or bearing capability of the racking system, to forces applied laterally to the bracket.

The racking system can include two support flanges which are one or more of the following features: extending from a common support plate to form a set of support flanges; mounted to a wall means to form a set of support flanges; one of the support flanges of includes a slot, while the other does not include a slot; both of the support flanges of the set includes a slot; the spacing between support flanges of the set is approximately the same dimension as the thickness or width of the bracket.

One or more than one of the following provides elasticity, or suspension, or damping means, for the racking system: the support flange, the bracket, the location of engagement of the bracket support to the support flange and or the bracket; is provided by the bracket and is achieved by means of the shape of the bracket at a portion of the bracket which is remote from the support flange; is achieved at or near to the location of the mounting of the bracket to the bracket support; is achieved by a spring or leaf spring formation formed with or as part of the bracket.

The slot can include an entrance passage and a terminus to limit the travel of the bracket and or the bracket support relative to the support flange.

The entrance passage can be one of the following: inclined so that the bracket support moves downwardly to the terminus; is inclined so that the bracket support moves horizontally then downwardly to the terminus; is inclined so that the bracket support moves upwardly then downwardly to the terminus.

The racking system can be secured to a wall means through the support flange or through the support plate.

The wall means can be one of the following: a stationary wall; part of a frame or stand.

The bracket support can be one or more of the following: formed separate from the bracket but is secured or is securable to the bracket; is releasably secured to the bracket; is integrally formed with the bracket; extends from one side of the bracket; extends from both sides of the bracket; extends between two portions of the bracket; a telescoping pin means; extendable and or retractable with respect to the bracket.

There can be multiple slots spaced along the support flange.

The racking system can further include at least two sets of support flanges spaced apart on the wall means from each other.

The support flange can include a flexible wall section or a wall section having sufficient elasticity, so that when engaged by the bracket or the bracket support the application of load to the wall section will be compressed allowing the brackets to flex upon loading.

The support flanges can be held together at their upper and lower extremities by respective mounting plates.

The present invention also provides a racking system for supporting objects on a wall means, the system including at least one support flange having at least one slot adapted to receive a bracket support and a bracket connected to or engageable with the bracket support to mount the bracket to the at least one support flange characterised in that the racking system includes a means of elasticity, or suspension or damping means so that load applied to the bracket by an object to be supported on the bracket will be such that the system will increase the time to bring the load to rest as compared with the bracket and its mount to the support flange being rigid.

The present invention further provides a racking system for supporting objects on a wall means, the system including at least one support flange having at least one slot and at least bracket support located between the slot and a free end of the support flange, a bracket connectable to or engageable with the bracket support to mount the bracket to the at least one support flange characterised in that the racking system includes a means of elasticity, or suspension or damping means so that load applied to the bracket by an object to be supported on the bracket will increase the time to bring the load to rest as compared with the bracket and its mount to the support flange being rigid.

The system can include one or more of the following: the support flange has at least two bracket supports; the bracket support is removable; the rear of the bracket makes contact with a rear support plate or wall means to which the support flange is attached; the at least one slot contributes to elasticity, or suspension or damping means; the at least one slot can receive a bracket support; a twin support flange arrangement, with the bracket support extending between the twin support flanges; bracket support is integrally formed or permanently attached to the support flange or flanges.

The present invention also provides a racking system for supporting objects on a wall or wall means, the system including at least one support formation formed integrally with the wall or wall means to which the rack system is to cooperate; or formed separately from the wall or wall means and attachable thereto; the at least one support formation has at least one support slot through an external face and a space between a rear face of the slot and a rear panel or the wall or the wall means.

The system can include at least one bracket having a bracket slot formed therein which is able to enter the support slot and having a rear portion which can enter into the space leaving a portion of the bracket slot on the external side of the

support formation, the rear of the bracket engaging the rear panel or the wall or the wall means thereby allowing the bracket to provide a means of elasticity, or suspension or damping means so that load applied to the bracket by an object to be supported on the bracket so that the bracket will increase the time to bring the load to rest as compared with the bracket being rigid.

The system can include a removable support means, the removable support means including at least one support flange, a support plate, a support hook able to be removably engaged with the wall means and a slot in the removable support means which opens on at least two faces, wherein two of the at least two faces are perpendicular to each other.

The support hook can be removably engageable with the slot in the support formation wherein at least a portion of the support hook lies in the space between a rear face of the slot and a rear panel or the wall or the wall means.

The removable support means can engage with a bracket.

A bracket for supporting watercraft for use in a system described above wherein the bracket can include a back load bearing edge, a top edge, a bottom edge, a front edge and a bracket support proximate the back edge; including at least a medial region where the top edge includes a concave or recessed portion; wherein a suspension means spans across the concave or recessed portion, the suspension means being fixed to the bracket at the proximal and distal ends of the concave or recessed portion along the top edge.

The suspension means can be a strap and the bracket includes one or more of the following: at least one slot at an entrance to the concave or recessed portion; the slot extends into an aperture larger than the slot; the concave or recessed portion includes at least two slots, with at least one on both entrances to the concave or recessed portion extending into the bracket ending in an aperture larger than the slot; the strap is connected on at least one end to a strap engaging pin; wherein the strap engaging pin engages with the aperture and is restrained from movement in the directions along the length of the bracket by the slot; and wherein the strap lies in the slot; the strap wraps around a strap engaging pin and exits the slot; wherein the strap engaging pin engages with the aperture and is restrained from movement in the directions along the length of the bracket by the slot; and wherein the strap lies in the slot and is adjustable to vary its length across the concave or recessed portion; the strap is of a fixed length; the strap is of an adjustable length; the strap of bracket includes a lock mechanism must first be released to adjust the length of the strap; the bracket being angularly adjustable in relation to a support member on which the bracket is to be mounted.

The suspension means can be the top edge of the bracket and the bracket has one or more of the following features: the top edge contours to the hull of a to be supported watercraft; the bracket is angularly adjustable in relation to a support member on which the bracket is to be mounted, by means of the use of a support means engageable with the support member; the bracket is angularly adjustable in relation to a support member on which the bracket is to be mounted, by means of the use of a support means such as pins engageable with apertures at varying lengths along the bracket.

The suspension means can be

an inflatable bladder and the bracket has one or more of the following features: the bladder is fixed to the top edge of the bracket along the entire length of the concave or recessed portion; the bladder is fixed in at least one point at the entrance to the concave or recessed portion; the bladder is connected by at least one end to a strap engaging pin, wherein the strap engaging pin engages with the aperture and is restrained from movement in the directions along the length of the bracket by the slot, and wherein the strap lies in the slot.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment or embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings.

FIG. **1** illustrates a perspective view of a racking system including two support flanges, a bracket support slot and a bifurcated bracket;

FIG. **2** is a perspective view of a racking system including two support flanges, a bracket support slot and a bracket; and

FIG. **3** illustrates a perspective view of a racking system including two support flanges wherein only one support flange comprises of a slot and a bracket.

FIG. **3**A is an enlarged view of a section of the support flange of FIG. **3**.

FIG. **4** illustrates a reverse perspective view of the racking system from FIG. **3**, including two support flanges wherein only one support flange comprises of a slot, a bracket support slot and a bracket;

FIG. **4**A is an enlarged view of a section of the support flange of FIG. **4**.

FIG. **5** illustrates a perspective view of a racking system including a single support flange, a bracket support slot and a bifurcated bracket;

FIG. **6** is a top down view of a rack system illustrating a single support flange, a bifurcated bracket and the disc flanges of a bracket support;

FIG. **7** is a top down view of a racking system illustrating two support flanges, a bifurcated bracket and a bracket support engaged with said bifurcated bracket and two support flanges;

FIG. **8***a* is a top down view of a racking system illustrating a support flange, wherein one of said support flanges comprises of a blind slot, a bracket and a bracket support engaged with said bracket and two support flanges;

FIG. **8***b* is a bottom up view of the racking system of FIG. **8***a;*

FIG. **9** is a side on view of a variety of canter lever brackets illustrating a variety of dimensions and engaging means;

FIG. **10** illustrates in the top part of the figure a variety of single bracket profiles for supporting a variety of different loads, while it illustrates in the lower part a variety of multiple bracket profiles for supporting loads;

FIG. **11** illustrates a side on view of a bracket illustrating a bracket support disc flange and illustrating an extended aperture in said bracket allowing for flex in said bracket upon loading;

FIG. **12** illustrates engaging means in a bracket wherein the engaging means incorporates a damping means;

FIGS. **13** to **20** are plans views of brackets respectively showing: a bracket support extending from one side of said bracket; bracket supports extending from both sides of the bracket; bracket support extending from one side of said bracket; bracket supports extending from both sides of said bracket; bracket supports extending from both sides of said bracket, wherein said bracket supports have a disc flanged end; a bracket support extending from one side of said bracket, wherein said bracket support is a disc flanged end; bracket support being a spring-driven extendable pin; bracket supports having an extendable pin with a spring lock mechanism;

FIG. **21** illustrates a releasable bracket support;

FIG. **22** is a perspective view of a bracket engaged with a support flange through the use of a pin in a slot;

FIG. **23** is a perspective view of a bracket engaged with a support flange through the use of a pin, wherein said pin is disc flanged;

FIGS. **24** to **28** are section view of a bracket respectively showing: bracket support on one side and integrally formed; bracket support on both sides and integrally formed; a bracket support extending from two sides from said bracket, includes locking pin means; a removable bracket support extends from two sides of said bracket and includes thread; a bracket support extends from two sides of said bracket and is integrally formed there within;

FIGS. **29**, **29**A and **30** illustrates respectively: a support flange, with a plurality of slots are located for engaging means; a support flange, wherein a plurality of slots are located for engaging means; a support flange with a plurality of slots for engaging means;

FIG. **31** is a front on view of a bracket support engaged with a bracket;

FIG. **32** is a front on view illustrating a bracket support engaged with the bracket whilst engaged with a support flange;

FIG. **33** is a perspective view of a single support flange engaged with a bracket support and bracket;

FIGS. **34** to **38** are side views of a bracket support respectively showing: a horizontal then vertical slot; an angled and vertical slot; a slot that is angled in two directions; a slot that is angled up and vertical; a slot that is angled up, vertical and horizontal;

FIG. **39** is a perspective view of a racking system with a support plate and support flange forming an L shape.

FIG. **40** is a perspective view of a bracket engaged with a single support flange,

FIGS. **41**, **42**, **43** and **44** illustrate brackets in perspective view;

FIGS. **45**, **46** **47** and **48** are respectively perspective views of: a series of brackets in a stand mounted racking system; a racking system where aligned brackets are connected by means of struts; another racking system where aligned brackets are connected by means of struts; a stand mounted racking system;

FIG. **49** is a perspective view of a bracket with bracket support attached;

FIG. **50** is a perspective view of bracket arrangements particularly useful for carrying hangers;

FIG. **51** is side view of the cantilever bracket of FIG. **50**.

FIG. **52** is a perspective view of the brackets of FIG. **50** on the rack system, with a forward support;

FIG. **53** is a perspective view of the brackets of FIG. **50** with a different forward support;

FIG. **54** is a perspective view of the bracket in cantilever mount to the rear support flanges;

FIG. **55** is a side view of the racking system of FIG. **52**;

FIG. **56** is a side view of the racking system of FIG. **53**;

FIGS. **57** and **58** are perspective view of two arm brackets;

FIG. **59** Illustrates a rack embodying the improvements of FIGS. **50** to **56**;

FIG. **60** Illustrates a perspective view of part of an alternative bracket to the bracket of FIG. **50**;

FIG. **61** illustrates a perspective view of a single support flange having slots and apertures to mount bracket supports onto the support flange;

FIG. **62** illustrates a side view of the support flange of FIG. **61**;

FIG. **63** illustrates a perspective view of a dual support flange similar to single support flange of FIGS. **61** and **62**, supporting an locking a surfboard to the bracket;

FIG. **64** is a perspective view of the support flange and the brackets of FIGS. **61** and **62**;

FIG. **65** illustrates a perspective view of a twin support flange with bracket supports attached through apertures in the support flanges;

FIG. **66** illustrates a left side elevation of a rack system consisting of wall or wall plate and bracket having an elasticity, suspension or damping features;

FIG. **67** is a cross section through a portion of FIG. **66**;

FIG. **68** illustrates a right side perspective view of the wall or wall plate and bracket system of FIG. **66**;

FIG. **69** illustrates a left side elevation of the system of FIG. **66** showing multiple brackets in position;

FIG. **70** illustrates a right side perspective view of a wall or wall plate receiving several brackets across the width; and

FIG. **71** illustrates the system of FIGS. **66** to **69** where two wall mounted plates are used to space brackets laterally with respect to each other.

FIG. **72** illustrates a front perspective view of a removable support means with bracket supports able to be removably engaged with the support slots in FIGS. **68**, **70** and **71**.

FIG. **73** illustrates a rear perspective view of the removable support means of FIG. **72**.

FIG. **74** illustrates a front perspective view of an alternative removable support means as in FIG. **72** with a vertical slot able to engage with a removable bracket support.

FIG. **75** illustrates a rear perspective view of the removable support means of FIG. **74**.

FIG. **76** is a side view of a bracket for supporting watercraft illustrating apertures for receiving support means, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **77** is a side view of a bracket for supporting watercraft illustrating a strap member engaged with the top edge of the bracket, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **78** is a perspective view of the bracket of FIG. **77** with the addition of a support pin;

FIG. **79** is a perspective view of a bracket for supporting watercraft illustrating a strap member engaged with pins in strap supporting apertures, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **80** is a perspective view of a bracket for supporting watercraft as in FIG. **4** with a ladder lock on the strap and caps on the pins in the strap supporting aperture;

FIG. **81** is a perspective view of the bracket of FIG. **80** engaged with a support member;

FIG. **82** is a side view of a bracket for supporting watercraft illustrating a strap, a toothed cam lock on the brackets front edge, a T lock on the end of the strap, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **83** is a perspective view of the bracket of FIG. **82** with the addition of a support pin;

FIG. **84** is a side view of a bracket for supporting watercraft illustrating a strap, a toothed cam lock on the brackets top edge, a T lock on the end of the strap, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **85** is a perspective view of the bracket of FIG. **84** with the addition of a support pin;

FIG. **86** is a side on view of a bracket for supporting a watercraft illustrating a strap, a guide stop on the front edge of the bracket, a T lock on the end of the strap, a top edge with a U shaped medial section and additional supporting aperture in the front edge;

FIG. **87** is a perspective view of the bracket of FIG. **86** with the addition of a support pin;

FIG. **88** is a side on view of a bracket for supporting a watercraft illustrating a strap, a guide on the front edge of the bracket, a rotating cylinder attached to the strap for shortening, toothed ends and a locking member for engaging the cogged ends and additional supporting aperture in the front edge.

FIG. **89** is a perspective view of the bracket of FIG. **88**.

FIG. **90** is a side view of a bracket for supporting a watercraft illustrating a wrap around adjustable strap.

FIG. **91** illustrates the bracket of FIG. **90** with a tapered strap receiving slot.

FIG. **92** illustrates a bracket for supporting a watercraft illustrating a bladder fixed to the bracket on one end, a top edge with a U shaped medial section and additional supporting aperture means in the front edge;

FIG. **93** illustrates a bracket for supporting a watercraft illustrating a removable deflated bladder with a valve and additional supporting aperture means in the front edge;

FIG. **94** illustrates a bracket for supporting a watercraft illustrating a removable deflated bladder with a valve, webbed siding and an additional supporting aperture in the front edge;

FIG. **95** illustrates a bracket for supporting a watercraft illustrating a bladder fixed to a U shaped top edge medial section and an additional supporting aperture in the front edge.

FIG. **96** illustrates a bracket for supporting a watercraft including an inflated bladder and an additional supporting aperture in the front edge.

FIG. **97** illustrates a bracket support for supporting a watercraft including adjustable angular positioning and a top edge for contouring to the hull of the watercraft;

FIG. **98** illustrates an angled bracket support for supporting watercraft engaged with a supporting member with no angular displacement;

FIG. **99** illustrates an angularly adjustable bracket fixed in the position of greatest angular displacement.

FIG. **100** illustrates an angularly adjustable bracket fixed in the position of minimal angular displacement using adjustment pegs, but further angular change, as depicted in FIG. **98** being possible.

FIG. **101** illustrates an angularly adjustable bracket fixed in an intermediate position of angular displacement;

FIG. **102** illustrates a bracket support for supporting a watercraft without angular adjustment and a top edge with a U shaped or three sided recess medial region;

FIG. **103** illustrates a bracket support for supporting a watercraft in a variety of angular positions.

FIG. **104** illustrates a perspective view of an apertured support panel with rear channels and front recesses, and a variety of blind recesses for illustrative purposes only.

FIG. **105** illustrates a partial perspective view of the rear face of the support panel of FIG. **104**.

FIGS. **106**, **107** and **108** illustrate a perspective view respectively: a rear face of a support panel showing a variety of rear face recesses for illustrative purposes, one with front face recesses, and one with rear channels and radiused aperture walls.

FIG. **109** illustrates front view of an assembly of apertured support panels located adjacent to each other where all apertures are in the same alignment.

FIGS. **110**, **111**, **112**, **113**, **114**, **115**, **116**, **116**A, **117**, **118** and **125** illustrate respectively: a bracket with outwardly curved hanging arm sections; the bracket of FIG. **110** with a bolt; the bracket of FIG. **111** with hanging bar and ring attachment; the bracket of FIG. **110** with a hanging bar and ring attachment; an X-shaped or pivoting bracket; a sliding double capped box section support member; a beam support member; another arrangement for a beam support member; the bracket used in of FIG. **116**; the bracket used in FIG. **116**A; a perspective view of an apertured panel secured to a ceiling location with brackets such as those of FIGS. **110** to **118** attached.

FIGS. **119**, **119**A, **120**, **120**A, **123**, **123**A, **124**, **126**, and **126**A illustrate respectively: a side elevation of a bracket for use with an apertured panel; front elevation of apparatus of FIG. **119**; a perspective view of apparatus of FIG. **119** in situ with a panel; perspective view of FIG. **120** where the bracket is engaged with the panel; a perspective view of an article partially assembled to the bracket of FIG. **119**; a fully assembled article and bracket as in FIG. **123**, a wire frame perspective view of an assembly a cabinet attached to a panel with bracket of FIG. **119**; a side views of FIG. **123**; and aside view of FIG. **123**A.

FIG. **121** illustrates a perspective view of the hanging support similar to FIG. **120**, but modified to provide better interlocking and movement resistance.

FIGS. **122** and **122**A illustrates a side view and end view of an alternative profile of the hanging support of FIGS. **119** to **121**.

FIGS. **127** to **131** illustrate respectively another bracket system in front perspective, front perspective with beam,; side view with beam; and cross section view of assembly with a panel.

FIGS. **132** to **135** illustrate a perspective view of respectively: a partially assembled art screen; a cantilevered stair assembly; a stair assembly between two support panels; an underneath perspective view of FIG. **134**.

FIG. **136** illustrates a wire frame perspective view of a two hooked support for attachment to a bracket, such as illustrated in the previous figures.

The numbering convention used in the drawings is that the digits in front of the full stop indicate the drawing number, and the digits after the full stop are the element reference numbers. Where possible, the same element reference number is used in different drawings to indicate corresponding elements.

DETAILED DESCRIPTION OF THE EMBODIMENT OR EMBODIMENTS

FIGS. **1** and **7** illustrate a racking system including two support flanges **1.001**, with two different types of bracket support **1.004**, **1.111** and three different types of bifurcated bracket **1.003**, **1.095** and **1.096** each having a different engaging means **1.013**, **1.014** and **1.004**. The bifurcated brackets **1.003**, **1.095** and **1.096** differ from each other by the manner in which they engage the support flanges **1.001**, which will be further described below in the description of FIG. **9**. Illustrated in FIG. **57** is a perspective view of the bracket **1.003**, showing how the two arms of the bracket are joined by means of struts or joining pieces **57.456**.

In FIG. **1** the support flanges **1.001** extend generally perpendicularly from a support plate **1.010**, with the support flanges being fixed to the support plate **1.010**, to make a structure which in cross section resembles a π shape. The space **1.0020** between the outward surfaces of the two flanges **1.001** is approximately the same as the space **1.0021** between the inward surfaces of the arms on the bifurcated brackets **1.003**, **1.095** and **1.096** so that each arm of a respective bracket sits on the outside of the two flanges. This arrange-

ment, in combination with the bracket support used, assists in the ability of the bracket assembly to resist lateral forces applied to the brackets.

The upper two brackets **1.003** and **1.095** in the illustration of FIG. **1** are the same type of bracket support **1.111**, which is also illustrated in FIG. **21**. The bracket supports **1.111** or **21.111** include a pin or rod sections **7.004**, **21.004** which are provided at their ends with flanges **1.011**, in this instance a disc shaped. The disc shaped flanges **1.011**, **7.011**, **21.011** are fixed to the pin **7.004**, **21.004** (which will be further described at FIGS. **7**, **8** and **9**) and may be removably connected by a thread system, integrally formed therewith, permanently fixed to the pin by thread and glue, simply glued or attached by any other appropriate means. As can be seen from FIGS. **7** and **21**, the perpendicular distance or space **21.022** between the inward surfaces of the discs **21.011** is approximately the same as the perpendicular distance or space **1.0022** between the outward surface of the arms of the brackets **1.003** and **1.095**. By this geometry the arms of the bifurcated bracket can be removable from the bracket support **1.111** and the disc flanges **1.011** act as additional reinforcement against lateral forces placed on the brackets **1.003** and **1.095**.

With respect to the bracket **1.096**, the disc flange **1.011** is absent and in this bracket arrangement the arms of the bracket **1.096** must be fixed, affixed or mounted to the bracket support **1.004**(in the illustrated case a pin), so that together with the geometry of the space **1.0020** and **1.0021**, lateral reinforcement is provided for the bracket assembly.

Along the length or height of the support flanges **1.001** are a plurality of slots **1.005** which are preferably equi-spaced there along. Each slot **1.005** opens to three surfaces of the support flange **1.001**, namely the front and two side faces. Whereas in other embodiments described below the slots open through two faces where the slots do not extend through the flange but open to the front face, and only one surface where the flange contains a blind slot as in FIGS. **3**, **4** and **8**.

Each slot **1.005** is shaped or profiled so that from the front face the slot angles downwardly from the horizontal and away from the opening in the front face of the flange and continues so until approximately the middle of the support flange **1.001**. Then the slot **1.005** proceeds downwardly in a vertical direction to the terminus of slot **1.005** which is preferably of a radiused or semi-circular shape. This is described in more detail with respect to FIGS. **22**, **23** and **34** to **38**.

The slots **1.005** are dimensioned so that the width of the slot **1.005** is apt to receive the pin portion **7.004**, **1.004** which comes to rest in the terminus of the slot as mentioned above, so that once a bracket such as **1.003** or **1.095** or **1.096** is engaged with a bracket support pin **7.004**, **1.004** then the bracket **1.003** or **1.095** or **1.096** will be held in a cantilever fashion with respect to the support flange **1.001**, by the bracket being held by pin **7.004**, **1.004** and the lower rear corner of the bracket **1.003** or **1.095** or **1.096** engaging the support plate **1.010**.

The slots **1.005** can be formed by any known means such as cutting, punching and moulding. When loaded, a bracket support pin **7.004**, **1.004** will bear the force from the bracket **1.003** or **1.095** or **1.096** in a direction towards the mounting wall or support plate **1.010**, as well as bearing the downwardly directed mass of any object placed on the end of a bracket. Thus in the racking system, both the bracket support in the slot and the wall and or the support plate on which the racking system is mounted will bear the loads.

The bracket **1.003**, **1.095** or **1.096** will pivot or rotate when loaded, until such time as the lower rear corner of the bracket **1.003**, **1.095** or **1.096** engages the wall and or the support plate **1.010**. This pivot results in the edge of the bracket lying in close proximity to the wall, in cooperation with the bracket support pin **1.004** bearing the bending moment produced by the load. This support mechanism will be described in more detail below with respect to FIGS. **22** and **23**.

In FIG. **1** the support flange **1.001** is shown as having two support flanges and a support plate. The support flanges **1.001** and the support plate **1.010** can be made of wood, metal, plastic, other polymeric or composite materials. The support flanges **1.001** and the support plate **1.010** can be formed as one piece using injection moulding, extrusion, routing, milling or other methods. If joined separately the support flanges **1.001** can be fixed to the support plate **1.010** using welding (plastic or metal), routing and joinery, screwing, bolting, riveting, gluing or a variety of other appropriate methods. Once joined the support plate **1.010** can used to fix or affix the rack system to a wall in a variety of ways including welding, screwing, bolting, riveting, joinery and others.

The wall to which the rack system is attached can be a stationary wall such as found in a building. However if desired, the wall can be part of a frame or stand upon which the racking system is to be mounted, with such a frame or stand being free standing or wheel mounted for easy movement and re-positioning.

In an alternative embodiment, a suitably wide support flange or flanges **1.001** can be secured directly to a wall or frame or stand support without the use of a support plate **1.010**. In this arrangement any appropriate fixing methods between a support plate **1.010** and supporting wall or frame can be used as described above.

The brackets **1.003** or **1.095** or **1.096** can be made of any appropriate material, and would most likely be made from the same material as the support plate **1.010** or the support flanges **1.001**, and can be formed using any appropriate method or technique. As illustrative dimensions for the system of FIG. **1**, the base width A is approximately 160 mm. while the height B is approx 2400 mm, with the depth C of the support flanges **1.001** being of the order of 100 mm. The length D of the bracket **1.096** is of the order of 750 mm, while the height E of the bracket end **1.096** is the order of 80 mm while its thickness is of the order of 25 mm.

FIGS. **2** and **8** illustrates a modified racking system which is similar to that described above. The racking system's two support flanges **2.001** are spaced apart so as to receive a single or non-bifurcated bracket **2.006** between the flanges. The inwards faces of the flanges **2.001** are spaced apart at a distance **2.0023** approximately equivalent to the width or thickness **2.0024** of the bracket **2.006** that sits between the flanges **2.001**, ensuring a close fit reinforcing the bracket with respect to lateral forces applied to the bracket when being loaded or unloaded.

In the embodiment of FIGS. **2** and **8**, the support flanges **2.001** are mounted to a support plate **2.010**, however, they can be formed and or joined in the same manner as described above.

In FIG. **2**, two types of bracket supports are shown, namely bracket support **2.111**, having disc flanges **2.011** on both sides and **2.004** without disc flanges. The disc flanges **2.011** are located adjacent the outward face of each of the support flanges **2.001**. The bracket support **2.111** differs from the bracket support **1.111** in that the distance **21.022** between the disc flanges **22.011** is less. By the disc flanges **2.011** being adjacent the outwards face of each support flange **2.001** the bracket **2.006** is reinforced against lateral forces applied to the bracket **2.006**.

As above the disc flanges **2.011** are fixed to the ends of a pin **2.004** and can be removable or permanently fixed. The

bracket **2.006** engages with the pin **2.004** between the disc flanges **2.011** and can be removable from the pin or fixed in place.

The two lower brackets **2.0061** illustrated in FIG. **2** can be of the same construction as the brackets **2.006**, however the brackets **2.0061** each have a single pin **2.004** to be the bracket support, that is the pin **2.004** does not include disc flanges **2.011**, but still sits in the flange slots **2.005** and is fixed to the respective bracket **2.0061**.

The bracket assembly of FIG. **2** functions in a similar manner as described above with respect to FIG. **1** to bear bending moments and loads placed on the brackets **2.006**, **2.0061**. Illustrative of the construction the length F of the bracket **2.006** is of the order of 750 mm, while the height E of the bracket end **2.006** is the order of 80 mm while its thickness is of the order of 25 mm.

Illustrated in FIGS. **3**, **3**A, **4**, **4**A, **8***a* and **8***b* is a racking system including a support flange with two support flanges **3.001** and **3.002** wherein support flanges **3.001** is identical to the support flanges **1.001**. However, the second support flange **3.002** has either a blind slot or no slot at all. The two support flanges **3.001** and **3.002** are spaced apart in the same manner as described for FIG. **2**. In the version which has a blind slot, such as slot **3**A.**098**, the blind slot opens through one surface of the support flange **3**A.**002** being the inwards face. The profile of the slot **3**A.**098** need only be straight and vertical, with the terminus **3**A.**051** being at the bottom of the slot **3**A.**098**, and at the same location or aligned with the terminus of the slot **3.005**, which is of the same profile as those in FIGS. **1** and **2**.

Where a blind slot **3**A.**098** is used with a single disc flanged bracket support **8**A.**111**, there are two possible methods of assembly. A first method requires the bracket support pin **8**A.**004** which has a single disc flange **8**A.**011** on at least one end of the bracket support pin **8**A.**004** being pushed through the support flange **8**A.**001** and through the bracket **8**A.**006** so as to enter the blind slot **8**A.**098** so that the pin **8**A.**004** will rest in the termini of the slots on the respective support flanges **8.002** and **8.001**.

A second method requires that the bracket support **8**A.**111** be pushed through the slot **3.005**, then into the blind slot **3**A.**005** and once there and in the termini of the slots on respective support flanges **3.001** and **3.002**, the bracket **3.006** can be positioned on the bracket support pin **8**A.**004** between the inward surfaces of the support flanges **3.001** and **3.002**.

If desired, a bracket support without disc flanges can be used in much the same manner as the bracket support **8**A.**111**, so that it will extend into the blind slot **8**A.**098** and thus into the support flange **8**A.**002** through the support flange **8**A.**001**. The assembly method used can be either of the first and second methods described above.

In the arrangement where the support flange **3.002** does not contain a slot, the bracket support **3.111** can be fixed to the bracket **3.006** and the bracket support pin **3.004** extends from only one side of the bracket and through the slotted side of the support flange **3.001**. The face of the bracket **3.001** abuts the inward face of the support flange **3.002** acting to reinforce against lateral forces. The bracket **3.006** lies within the flanges as described above.

The support flanges **3.001** and **3.002** and bracket **3.006** can be manufactured as mentioned above with respect to the previously described embodiments.

Illustrated in FIG. **4**A is support flange **4**A.**002** which has its slot **4**A.**005** part way through the support flange **4**A.**002**, and the slot **4**A.**005** only opens through two surfaces of the support flange **4**A.**002**, namely the inward surface of the support flange **4**A.**002** and the front face or surface. While one such support flange **4**A.**002** can be used with a support flange **4.001**, if desired two support flanges **4**A.**002**, one the mirror image of the other, can be used with the slots **4**A.**004** on the inward surfaces when assembled to a wall or to a support plate **4.010**. This will provide a racking system with a neater appearance, as the slots will not be visible from the outward directions, but the extra rigidity that is provided by the slots **4**A.**005** passing through only two surfaces, may not provide a sufficiently elastic suspension system of its own accord, but may do so with a suitably constructed bracket as will be described below. A similar comment can be made in respect of the blind slot **3**A.**005**.

FIGS. **5** and **6** show a racking system, wherein a single support flange **5.001** which receives in its slots **5.005** a flanged bracket support **5.111** or a pin type bracket support **5.004**, which engages or is engaged by a bifurcated bracket **5.003**. The single support flange **5.001** is fixed to the support plate **5.010** in a T shaped configuration.

The bracket **5.003** has an engagement slot **5.013** to receive the pin portion **5.004** of the bracket support **5.111**. The slot **5.013** has a second function which will be described in more detail below. A dual disc flanged **5.011** bracket support **5.111** is used with the gap between flanges **5.011** being approximately equal to the combined thicknesses of the support flange **5.001**, and the two arms of the bracket **5.003**. Further, the space between the two arms of the bracket **5.003** is approximately the same as the thickness of the single support flange **5.001**.

The bracket supports **5.111** or **5.004** operate with the bracket **5.003** in a manner similar to that as described for other embodiments and are numbered in the same way.

With the embodiments described above the bracket supports **1.111**, and **1.004** for example are described as being separate to or affixed to the respective brackets. However, if desired the respective bracket supports can be integrally formed, say be injection or other moulding, with the brackets, or for that matter, integrally formed with the support flanges or each support flange.

FIG. **8**A shows a support flange **8**A.**001** and **8**A.**002**, one being a slotted flange and the other having an aligned blind slot in the flange, with the blind slot **8.098** shown in partial cross section for ease of illustration. The bracket support pin **8.004** has one disc flange **8.011** at one end whilst the other end of the pin **8.004** sits within the blind slot **8.098**. In this arrangement the bracket support **8.111** is preferably fixed to the bracket, or the support flanges to avoid the bracket support **8.111** from inadvertently moving out of the slots upon the application of loads in use.

FIG. **8**B shows two support flange **8**B.**001**, and **8**B.**012** the former being slotted flange and the latter being without slots. The bracket support pin **8.004** is as described above for other embodiments and is numbered accordingly. In this arrangement the bracket support is preferably integrally formed with the bracket to avoid the bracket support moving out of the slot by loading forces. The bracket side without a pin **8.003** sits against the inward face of the support flange **8**B.**002** which is without slots and is held in place by the inward support flange walls and the pin **8**B.**004** of the bracket support **8**B.**111**.

FIG. **9** illustrates a series of cantilever brackets that may be engaged with a bracket support. Row **9.074** illustrates a bracket having an L-shaped aperture which extends first horizontally inwards from the wall mounted face of the bracket and then vertically upwards to a terminus. This engaging means holds the pin portion of the bracket support in the terminus of the vertical portion of the aperture. When the cantilever is loaded the pin in the bracket support and the load bearing lowermost, rearmost edge **9.062** prevents any further

rotation of the bracket around the pin of the bracket support. As discussed above the application of load in the form of bending moments on the cantilever brackets causes the bracket to pivot putting a load bearing force on the rear edge **9.062** and on the pin in the bracket support.

The L shaped apertures in row **9.074** can also work together with the shape of the slots in the support flange to damp movement, and provide a source of elasticity. The length and thickness of the bracket and the support flanges can assist in this role when a load is placed on the cantilever. When a load is placed on the bracket mounted on a support flange via the bracket support, the aperture can close around the pin of the bracket support thereby absorbing the force of loading and protecting the load from damage which will be further discussed below at FIGS. **11** and **12**.

Row **9.073** illustrates an engaging means for the cantilever bracket with a bracket support which has a slot that extends downwardly to the base of the bracket for an engaging with and receiving the bracket support and to provide a spring and or motion damping. The pin in the bracket support will sit in the terminus at the top of the vertical slot in the rear of the bracket. In this arrangement when engaged with a bracket support and loaded the vertical slot can flex, closing around the pin, thereby allowing the bracket to have elastic and damping properties, which will be further discussed below at FIGS. **11** and **12**.

Row **9.075** illustrates a cantilever bracket wherein three apertures at different vertical locations on the bracket are provided to receive the pin portions of the bracket support. Pins in a bracket support will extend through at least one of the apertures in the bracket. The brackets of row **9.075** can be used in one of two methods. Firstly they can be used with a single pin of a bracket support, in one of the three apertures. For more damping the upper aperture can be used, while for less damping the lower aperture could be used.

In a second method, two non disc flanged pins could be used in adjacent aperture, or separated by being in the top and bottom aperture, and then positioned in the slot on the support flange. In this instance the two pins can work together to provide a degree of elasticity. When more than one aperture in the bracket is used the cantilever is fixed in place and the pivoting of the bracket mentioned above does not occur. In this arrangement the force upon loading is absorbed at the aperture points. If the load bearing edge **9.062** of the cantilever is placed against the support plate or support wall the rear wall absorbs some of the force but the majority of the force is still absorbed by the bracket support pins through the apertures.

Row **9.072** illustrates a bracket support extended through a bracket. In this embodiment a single aperture is found in a bracket in close proximity to the load bearing edge **9.062** of the bracket. The cantilever will pivot around the aperture loaded engaged with a bracket support pin and force will be absorbed by the pin and the lower edge of the load bearing edge **9.062**.

Columns **9.016** through to **9.019** illustrate a variety of lengths of cantilever bracket that can be used with **9.016** illustrating a longer canter lever through to **9.019** illustrating a shorter canter lever. These differing lengths provide a gradation of elasticity whereby the longer brackets have more elasticity or capability for elastic deformation under load, than the shorter brackets.

FIG. **10** illustrates some of the variations possible in the profile of the brackets to be engaged with bracket supports and support flanges. Common to all cantilever brackets to be used in this racking system is the load bearing edge **10.062**. The load bearing edge lies along either the support plate or wall from which the support flanges project. The engaging slot or means of the brackets shown in this FIG. **10** as a variety of slots or apertures either circular, L-shaped, or vertical is to be in close proximity to this load bearing edge to enable firm support between the support plate or wall and bracket. The distance between the centre of the terminus of the aperture and the distance between the terminus of the slots in the flanges and the support plate or wall are generally of similar magnitude to restrict the bracket from pivoting upon loading. All of these examples can be fitted with all of the racking system variations as discussed above and below. The various shapes accommodate different equipment to be stored on the racking system, such as surf boards, surf skis, catamaran hulls, etc, with the upper brackets being single supports while the lower brackets having two three or four supports with combinations of hull supports at the top while below may be fishing rod or hanging hooks, or straight support arms, angled or not.

10.021 illustrates a straight cantilever bracket wherein hooked profiles have been cut along the length of the bracket allowing objects to be placed inside the hooks either individually or between brackets, such as fishing rods, ski poles etc, when more than one support flange is part of a racking system.

Bracket **10.030** illustrates a bracket that is angled down and finishes in a hook with engaging means designed to allow flex upon loading as will be described further below. By having a long vertical load bearing wall creating a longer vertical aperture the bending moment that is borne upon loading is increased meaning that greater flex will result upon loading of a lesser weight.

Bracket **10.028** illustrates a similarly profiled angle down hooked bracket as in **10.030** without the flexible engaging means for damping upon loading with a circular aperture able to receive a pin bracket support.

Bracket **10.029** is angled down and hooked as in that preceding two Figures and is equipped with dampening means but to a lesser extent than **10.030** with more force being required to engage the flexing motion as the length of the vertical aperture is shorter creating less torque than on **10.30** upon the same loading.

Bracket **10.031** illustrates an angled up bracket with a turned up end also with a vertical aperture damping means at the engaging aperture with a long aperture creating large torque and flexing from a lesser weight than for **10.29**.

Bracket **10.026** illustrates at straight cantilever with a curved face to engage loaded goods with a circular aperture for receiving a pin bracket support near the load bearing edge. Bracket **10.027** is of a similar arrangement with a shorter length and greater radius of curvature in proportion to diameter to support loads in place.

Bracket **10.022** is a bracket angled slightly up with a vertical aperture dampening means at the engaging aperture as for **10.29**. While bracket **10.023** illustrates a slightly angled up straight cantilever with a L-shaped aperture engaging means providing elasticity and or allowing damping of force from a load. In this example as the aperture extends to the load bearing edge, as the force first exerts upon the bottom edge this dampening the dampening effect of this arrangement will require more force and weight to be used than in the other examples. Bracket **10.024** is a angled up straight bracket with a circular aperture engaging means leaving any damping properties to the properties inherent in the material of the bracket itself. Whereas bracket **10.025** is a straight bracket angled up more so than in **10.24** with a round aperture giving limited dampening properties.

The examples of brackets in FIG. **10**, particularly those with the slots, can also have a circular aperture above the slot (as in bracket **10.031**) to receive the pin of a bracket support, so that a user is able to use either means. This will allow the maximum length of slot so as to provide elasticity and or damping of the motion of an object placed or dropped onto the bracket when mounted in a racking system as described previously.

FIG. **11** illustrates a side-on view of the engaging slot or engaging means **11.013** of a bracket with damping or elastic properties in the bracket. The generally vertically aligned slot **11.013** has a width that remains open when the bracket is unloaded. Upon loading the bracket, with the pin **11.004** at the top of the slot **11.013** and in the slot **1.005** in the support flange **1.001**, as has been described above, the supporting plate **1.010** or the supporting wall to which the supporting flange **1.001** is mounted, will be engaged or abutted by the lowermost rearward most portion of the rear edge **11.0621** (in the vicinity of where lead line for **11.062** is pointing), in this case on the rear tongue **11.008**. At which point the bracket cannot rotate further and the corner or edge **11.053** will approach the edge **11.052** on the opposite side of the slot **11.013** thereby flexing around the pin **11.004** closing the gap **11.013** due to the bending moment applied by and to the bracket. For the elasticity and or damping to be generated the back face **11.062** of the bracket needs to be in close proximity to the support plate **1.010** or mounting wall from which the support flanges **1.001** extend, so that the bottom edge **11.0621** of the load bearing rear edge **11.062** can engage with the support plate or wall thereby causing the closing of the gap. In this embodiment a separate removable bracket support **11.111** with a pin **11.004** is shown. Where a disc flanged end on the bracket support is used a support flange having slots which open through three faces of the support flange is preferred.

In the arrangement of FIG. **11**, a pin receiving aperture **11.041** is provided above the upper termini of the slot **11.013** so that a user has the option of changing the rest angle of the bracket with respect to the support flange and simultaneously increasing the elasticity or damping by not requiring the pin **11.004** to be located in the slot **11.013**. If the rest angle of the bracket with respect to the support flange needs to be different the aperture **11.041** can be located at a different location on the end of the bracket.

FIG. **12** illustrates a bracket end similar to that of FIG. **11** where pin **12.004** is used without a disc flange wherein the pin extends into a slot either blind or through. Illustrative of the dimensions used for the brackets of FIGS. **11** and **12**, the length G is of the order of 160 mm while the height H is of the order of 215 mm with the bracket height J being of the order of 100 mm. The width of the slot **12.013** is of the order of 23 mm while the pin **12.004** is of a radius of the order of 11 mm.

FIG. **13** is a top down view of a bracket wherein a bracket support **13.032** is integrally formed within the bracket extending from one side of the bracket. A two flanged support flange will be required with the bracket of FIG. **13**, so as to fit between the inward surfaces of the support flanges as described above for FIGS. **3**, **4**, **8**A and **8**B. The slot in which the bracket support engages need not be square to the surface of the flange, the slot can be rounded or irregularly shaped and still hold this bracket support. The distance between the flanges will need to be approximately the same as the width of the bracket.

FIG. **14** illustrates a top down view of a bracket wherein bracket supports are integrally formed within the bracket and extend from two opposite sides of the bracket. In this embodiment a support flange with two slotted flanges is required with the bracket sitting between the flanges. In this embodiment the slots in the flanges need not be square as in FIG. **13**.

The embodiments of FIGS. **13** and **14** allow the use of blind slots in the support flanges, wherein the flexibility between the adjacent support flanges can allow them to be prised away form each other to allow the tapered, hemispherical or conical bracket supports **13.032** and **14.032** to make their passage into the blind slots. These embodiments also allow the blind "slots" to be discrete blind recesses which are not elongated, such as circular recesses, to be used.

FIG. **15** is a plan view of a bracket wherein a square or cylindrical bracket support **15.034** is integrally formed with the bracket extending from one side. In this embodiment a support flange with two flanges is required as for FIG. **13**. The distance between the support flanges will preferably be approximately the same as the width of the bracket.

FIG. **16** is a plan view of a bracket wherein a pair of opposed bracket supports **16.034** are integrally formed with the bracket extending from two opposite faces of the bracket. The bracket lies between the flanges and the bracket supports engage with adjacent slots as for FIG. **14**.

FIGS. **17** and **18** are plan views of brackets having integrally formed bracket supports **17.036** and **18.036** which are integrally formed as in FIGS. **15** and **16**, except that disc flanges **17.011** and **18.011** are also integrally formed with the bracket.

FIG. **19** is a plan view of a bracket wherein bracket supports are integrally formed with or separately formed and attached to the bracket, with the bracket supports located on opposite sides of the bracket. The bracket supports **19.038** are telescoping biased pins **19.039** where the external perimeter of the extendible portion of the pin **19.039** sits inside the internal perimeter of the fixed portion **19.0391** of the pin **19.038** where a compression spring **19.032** is situated to provide a bias forcing the moveable portion **19.039** in an outward direction. When in the rest position the pins are extended due to springs **19.0392** expanding and pushing out the pins. The bracket of FIG. **19** is usable with blind slots and with open slots, as well as racks which have one of two or both support flanges having slots. The extendable pins can be compressed in order for the bracket supports to fit within the blind slots. When in the compressed position the distance between the two extendible pins will fit within the distance between the internal walls of the two blind slots that are parallel with the side walls of the brackets. When the distance between extendible pins extended is greater than the distance between the surfaces through which the blind slots open. The bracket otherwise sits within the support flange as described above. This arrangement can also be used in a support flange consisting of two flanges wherein the flanges comprise slots open on three faces.

FIG. **20** is a plan view of a bracket including bracket supports as in FIG. **19** with extension of the extendible pins **2.039** being controlled by an internal spring lock **20.051** which is in turn controlled through the use of an external button **20.040** and internal pin **20.049**. When the button mechanism is pressed the internal pin is extended into the extendible pin moving a leaf spring which allows a major spring to extend the extendible pin. The leaf spring and internal pin allow the extendible pin to be locked in the extended and retracted position. For the bracket supports to engage with a support flange the extendable pins must be contracted to fit within blind slots as in FIG. **19**.

FIG. **21** illustrates a bracket support system including a pin **21.004** and a disc flange **21.011**. The pin is disc flanged with two disc flanges leaving the space **21.022** between the two disc flanges apt to receive a bracket and a support flange. The

Figures described above have illustrated instances where disc flanged bracket supports are to be used. The disc flanges are fixed to the pin in this arrangement but can be removable. Illustrative of the dimensions of the pin **21.004**, this has a radius of the order of 11 mm while the flanges **21.011** have a radius of the order of 35 mm.

FIG. **22** shows a detailed perspective view of portion of a support flange with a bracket **22.006** engaged with a bracket support **22.111** including a pin between disc flanges **22.011** sitting in the terminus of a slot **22.005** in the support flange **22.001**. As illustrated it is possible for the bracket **22.06** to be held by a two support flanges **22.001** or a single support flange **22.001** with the two disc flanges acting to restrict lateral movement. The pin is inserted into the opening **22.057** of the slot **22.005** and is then progresses along the angled slot section **22.058** (angled downwardly from the horizontal) and then progresses down the vertical section **22.059** of the slot to sit in the radiused or semi-circular terminus **22.060** of the slot. The bracket is mounted and held in place as described above for similar embodiments and is numbered accordingly.

FIG. **23** illustrates a bracket **22.006** engaged with a non disc flanged bracket support **23.004** which is in turn engaged with a slot **23.005** within a support flange. The non disc flanged bracket support **23.004** operates in the same way as described in previous similar embodiments and is numbered accordingly. Illustrative of the dimensions of the system of FIG. **23** is that the slot **23.005** is of the order of 23 mm wide while the pin **23.004** has a radius of approximately 11 mm, while the thickness L of the support flange is of the order of 18 mm.

FIG. **24** illustrates a bracket **24.006** including a disc flanged pin bracket support **24.041** that is integrally formed within the bracket **24.06**. The bracket support extends only from one face of the bracket. The bracket can be supported by a slot which opens on three faces of a single flange support wherein the face of the bracket on the side of the disc flanged end will be in close proximity with the flange to restrict lateral movement. Alternatively this bracket and bracket support can be used in a two flange support flange in a manner as described above in similar embodiments. When the bracket support is inserted in a single flange support the bracket support can engage with the disc flange sitting to one side of the flange whilst the bracket sits on the other side of the flange.

FIG. **25** illustrates a bracket **25.006** and bracket support means wherein one end of the bracket support **24.044** is disc flanged and the other end of the bracket support is a pin as described above in FIGS. **3**, **4** and **8**A. The bracket support **24.044** is integrally formed within the bracket to restrict lateral movement of the bracket support when engaged in a support flange. The bracket support is able to engage with a support flange including a single flange as in FIG. **5**, two flanges wherein both flanges comprise of slots as in FIGS. **1** and **2** or in a support flange including a blind slot and an open slot as in FIGS. **3** and **4**.

FIG. **26** illustrates a bracket **26.006** and bracket support **26.042** as in FIG. **25** with a locking pin means **26.065** that is spring driven. The bracket support is removable from the bracket through the use of the sprung pins. The sprung pins are pins sitting on extended springs in the rest position. The bracket support is able to engage with a support flange including two flanges wherein one flange has open slots and the other flange has blind slots with openings in the walls perpendicular to the flange sides in contact with the bracket apt to receive the sprung pins. The sprung pins can be retracted through the application of force and then inserted into the slots within the apertures which then extend when aligned with the openings in the slots. In one instance the pins are rounded in one direction and the application of force in that direction causes the springs to compress allowing the bracket support to be removed. In another arrangement the pins are released through the use of a button that is connected to a leaf spring within the bracket support pin.

FIG. **27** comprises a bracket **27.006** and bracket support **27.043** as in FIG. **26** where the bracket support contains a threaded end **27.067** to fix the bracket support to a flange in a support flange rather than sprung pins. The bracket support is removable from the bracket and has a disc flanged end that extends past one side of the bracket and a threaded screw end extending past the other side of the bracket. In this embodiment the bracket support can be engaged with a support flange including two flanges wherein one flange has slots as described above to receive the disc flanged end of disc flanged end side of the bracket support and the other flange having threaded holes apt to receive the threaded screw end of the bracket support.

FIG. **28** is a bracket **28.006** and bracket support **28.045** wherein the bracket support is a pin that extends from two opposite sides of the bracket. The bracket support operates in a similar manner to that described in other similar embodiments and is numbered accordingly.

The support flanges of FIGS. **29**, **29**A and **30** includes a multiple number of slots as described above in similar embodiments and is numbered accordingly. By varying the number of slots, the distance between the slots, the depth of the support flange and the length of the slots, the elasticity of these cantilevering wall sections **29**/**29**A/**30.071** can be established as required or desired.

Illustrated in FIG. **31** is a bracket support pin **31.004** and disc flanges **31.011**, whereby the disc flanges are not located at the ends of the pin **31.004**. In FIG. **31** the bracket support is engaged with a bifurcated bracket **31.003** as in the prior embodiments. Adjacent the inward faces of the bifurcated brackets are disc flanges **31.011** sitting around the diameter of the pin. The pin **31.004** sits within slots either blind or open on three faces in two flanges as described above and the internal disc flanges restrict lateral movement by the brackets. The disc flanges are fixed to the pin and the bifurcated arms are removable from the bracket support. Alternatively the bracket support sits within a single flanged support flange as described above with the disc flanges acting as spacers between the flange sides and the bracket sides.

FIG. **32** shows the bracket **32.003** and bracket support pin **32.004** and disc flanges **32.011** system from FIG. **31** engaged with a support flange **32.002**. The disc flanges **32.011** around the diameter of the bracket support pins **32.004** create a space between the support flange **32.002** and the bifurcated bracket arms **32.003** allowing clearance. Additionally a space **32.080** between the disc flanges **32.011** and the flange **32.002** is present allowing for expansion and contraction of the materials in the bracket, bracket support and flange under environmental conditions. The bracket support is inserted into a slot opening **32.057** and sits in the terminus of the slot as described above.

FIG. **33** shows a bracket **33.003** and bracket support pin **33.004** system engaged with the flange in a support flange **33.002** from FIG. **32**. The extension of the bracket support pins **33.004** is beyond the outside face of the brackets. The brackets support **33.004** is engaged with a slot **33.005** in the support flange **33.002** as described above in previous embodiments. The bracket support is fixed to the bracket and a space **33.077** is created between the bracket and flange

Illustrated in FIGS. **34** to **38** are a range of other slot profiles that can be used with the embodiments described above. The support flange **34.002** in FIG. **34** shows a slot in a

support flange where the slot extends in the horizontal **34.083** and then extends down in the vertical **34.059** finishing in a terminus in which a bracket support pin can sit. The support flange **35.002** in FIG. **35** has a slot extending down from the horizontal **35.059** which then extend down in the vertical **35.059** to end in a terminus where a bracket support pin will sit with a bracket and load.

The support flange **36.002** in FIG. **36** shows a slot **36.084** extending downwards at an angle **36.086** approximately 45 degrees from the vertical. The slot then extends down with a vertical and horizontal component towards the face in which the slot opened originally at **36.085** at an angle of approximately 90 degrees **36.086**.

The support flange in FIG. **37** shows a slot that extends from the opening up from the horizontal **37.089** at an angle of approximately 45 degrees to the vertical **37.8082** and then goes down in the vertical **37.059** to stop at a terminus wherein a bracket support can rest. The support flange in FIG. **38** shows a slot extending up from the horizontal **38.090** at an angle of approximately 45 degrees **38.093** then the slot goes down in the vertical **38.059** to then move back in the horizontal **38.094** towards the face in which the slot entered the support flange.

With the embodiments of FIGS. **37** and **38**, sharp corners are illustrated but in practice these would be radiused or rounded, so as to minimise stress fracturing. Each of the embodiments of FIGS. **34** to **38** has a differently shaped cantilevering wall section, and thus a differing amount of elasticity and or damping effect will result. The profiles of FIGS. **34** to **38** are cut into the support flange through cutting, punching, pre forming, extrusion or other means.

FIG. **39** illustrates a rack system element where the support flange **39.001** and the support plate **39.010** are connected in a L shaped orientation. The support flange **39.001** and support plate **39.010** can be formed together or fixed later in the same way as mentioned above for other support flanges or support plates and can be made of the same materials. The slots are formed in the same way as mentioned above and can interact with bracket supports and brackets as mentioned above where the support flange contains one flange.

FIG. **40** illustrates a rack system element where a support flange **40.001** is provided with sufficient thickness that will enable direct connection of the support flange **40.001** to a wall or frame or stand, but otherwise interacts with bracket supports and brackets in the same ways as described above. The support flange **40.001** can be joined to a wall in any appropriate manner, such as welding, gluing, riveting, or screwed directly or via hanging brackets etc. The amount of securing necessary will be to prevent relative movement of the support flange **40.001** away from the supporting wall when the brackets are "rotated" under a load.

FIG. **41** illustrates a cantilever straight bracket **41.027** where a radius of curvature is found in the loading section of the bracket. The radius of curvature is large in relation to the length of the bracket. The bracket has a pin **41.004** located near the load bearing edge of the bracket that may be removably connected to the bracket by a thread system, or integrally formed therewith or permanently fixed to the pin by thread and glue, or simply glued or attached by any other appropriate means. FIG. **41** shows the pin extending from only one side of the bracket but where there is an aperture open to two opposite sides of the bracket a pin can be extended through both sides of the bracket as described previously. A pin can also be mounted to both sides of the bracket.

FIG. **42** illustrates a straight cantilever bracket **42.094**, similar to the bracket **10.022**, and functions in the same way In this arrangement when engaged with a bracket support and load is placed on the bracket the vertical slot can flex, as was described above at FIGS. **11** and **12**.

FIG. **43** illustrates a straight cantilever bracket **43.095**, which is similar to the bracket **10.023**, with an L shaped aperture **43.014** which can work together with the shape of the slots in the support flange to damp movement, and provide a source of elasticity as described at FIGS. **11** and **12**.

FIG. **44** illustrates a straight cantilever bracket where a pin extends from the side of the bracket in the same way as for FIG. **41**. The pin is located further down the load bearing edge of the bracket than in FIG. **41**. This gives the bracket less support from the load bearing edge as less bending moment can be borne by the bracket and load bearing edge.

FIG. **45** illustrates a free standing racking system with the same racking mechanisms as described previously. Two sets of two flanges **45.001** are located back to back and are mounted to a support frame **45.102**. The support frame **45.102** is shaped in a T profile with the top of the T supporting the racking system on the ground. The side support frame lays on the outside of the support flange and is fixed to the flange using welding (plastic or metal), routing and joinery, screwing, bolting, riveting, gluing or a variety of other appropriate methods. A side support frame is able to join to two support flanges facing in opposite directions in order to allow loading in multiple directions from the same side support frame. When a support flange comprising of two flanges is used as depicted in FIG. **45** two side support frames are to be placed on opposite sides of the support flange which will give the racking system support and balance on the ground. If a support flange comprising of one flange as previously discussed a side support frame can be used that additionally includes a wall that extends along the ground underneath the support flange in order to supply balance and lateral support.

FIG. **46** illustrates a racking system having two L shaped support flanges as described above at FIG. **39** that uses a strut **46.198** that connects between brackets on the support flanges providing a hanging means. The support flanges are shown as L shaped but can any of the support flanges previously mentioned and include bracket supports **46.011**, engaging means **46.013**, **46.014** and slots **46.005**. The flanges will attach to a wall or flange through the same ways as discussed above. The support flanges are spaced apart the same distance as the length of the strut **46.198**. The support brackets **46.120** are joined together through the use of a strut **46.198** which is illustrated as a flat strut but can be of a variety of profiles including cylindrical. In one arrangement the brackets are formed with the strut initially setting a fixed distance at which the support flanges are to be spaced. In another arrangement the brackets are independent to the strut and the two can be joined post installation. In this arrangement the length of the strut can be suited to the desired distance between support flanges, the strut will either be segmented allowing it to be shortened or lengthened or it can be cut to suit. The strut and the brackets can be joined using the previously mentioned methods.

FIG. **47** illustrates a racking system with at least two π shaped support flanges **47.001** as described above at FIG. **1** that uses a bracket system that connects between support flanges providing a hanging means. The support flanges are shown as IF shaped but can any of the support flanges previously mentioned and include bracket supports **47.011**, engaging means and slots **47.005**. The flanges will attach to a wall or flange through any of the previously mentioned methods. The support flanges are spaced apart the same distance as the length of the strut **47.107**. The support brackets **47.028** are profiled as angled down pointed up hooks but can be of any of the profiles mentioned above. They are joined together

through the use of a strut **46.098** which can be cylindrical as shown but can be a strut of any cross sectional profile. In one arrangement the brackets are formed with the strut initially setting a fixed distance at which the support flanges are to be spaced. In another arrangement the brackets are independent to the strut and the two can be joined post installation. In this arrangement the length of the strut can be adjusted in the manner mentioned at FIG. **46**.

FIG. **48** illustrates a free standing racking system that includes at least two support flanges **48.001** which are connected by a fixing wall **48.125** and base plate section. The fixing wall is connected to the flanges **48.001** in the same way that the support plate is as mentioned above. The base plate is connected to both the fixing wall and the support flanges. The three components can be formed using any of the previously mentioned methods. The brackets **48.006** connect to a bracket support **48.111** in the same way as previously described which in turn sits in a slot **48.005** in the same manner as the previously mentioned racking arrangements. The fixing wall and base plate act to reinforce the support flanges from forces approaching in the lateral direction. Where there are holes **48.101** in the fixing wall access is increased and transportation of the fixing wall or racking system is simplified. The holes can be cut, punched or moulded into the fixing wall. Alternatively the fixing wall can be a solid piece fitted between the support flanges or can be or a variety of profiles.

FIG. **49** illustrates a bracket **49.096** with two pins extending from either side of the bracket with disc flanges for a bracket support as mentioned above throughout the embodiments.

FIGS. **50** and **51** illustrates a bracket assembly having twin brackets **50.122** that has extensions **50.106** extending downwardly and away from the rear of the brackets. The extensions **50.106** are joined by means of a strut **50.107**. The extensions **50.106** each contain a plurality of notches to receive the hooks of clothes hangers. The rear of the brackets **50.122** contain two bracket support receiving means which are meant as alternatives, one being a slot extending downwards to as described above under FIGS. **11** and **12** and the other being circular aperture **50.062** enabling the use of a pin as described above in other racking system arrangements. Two brackets by being joined together at the ends of the downwards extension means that as shoppers are taking clothes off storage from extensions **50.106** they can place garments or wetsuits that they like onto the strut **50.107**. The brackets **50.122** are each to be supported by respective support flanges, as is described above.

FIGS. **52** and **55** illustrate a racking system where the bracket **52.106** as described at FIGS. **50** and **51** engages with respective rear support flanges **52.002** and the strut **52.107** is held by a notched vertical member **52.108**. The strut **52.107** connected between the two brackets at the end of the angled down bracket arms **52.110** is further supported at the front by a notched vertical member **52.108**. The strut sits in a notch along the length of the vertical member between the ends of the bracket supports. To allow this racking system to be free standing a connection plate is required to connect the tops of the support flanges and the top of the notched vertical member **52.108**. While the lower ends may be inserted in ground drilled apertures, the preference is that the bottoms of the support flanges and notched vertical member are also interconnected by a lower connection plate. This connection plate can be in the form of a plate that lays across the top and separately across the bottom of the support members and notched vertical support. The bracket support is engaged with a slot **52.005** through one of the two engaging means described in FIGS. **50** and **51**.

FIGS. **53** and **56** illustrate a racking system similar to that as described with respect to FIGS. **52** and **55**, where the notched vertical member **52.108** is replaced with a single slotted support flange **53.002** as described above in respect of FIG. **40**. In this arrangement the strut **53.107** sits within the slots in the flange rather than in notches, thereby providing potentially more positive support.

FIG. **54** illustrates a wall or frame mounted racking system similar to that of FIGS. **52** and **53**, except that the strut ends of the brackets remain cantilevered, and are not supported intermediately.

FIGS. **57** and **58** illustrate a bifurcated bracket as described above where additional cross supports **57.456** and **58.456** are placed between the bracket arms at the distal end for additional support.

Illustrated in FIG. **59** is a rack system which includes the features of FIGS. **52** and **55**, showing another arrangement for forming the racking system assembly of these Figures. The embodiment of FIG. **59** functions in the same manner as that of FIGS. **52** and **55**, except that the vertical members are integral with a 'flying buttress" frame which extends way from the wall to which the racking system is mounted.

Illustrated in FIG. **60** is another bracket, similar in construction to the brackets of FIGS. **50** to **56** and **59**, except that instead of notches on the bracket extension **60.107** are a series of raised projections **60.457** of generally cylindrical shape, providing means to prevent hooks of garment hangers form sliding down the extensions, and spacing them at regular intervals.

Illustrated in FIGS. **61** to **64** is a single support flange **61.002** similar to the single support flanges **5.002** described above. The difference being that a bracket support **61.004**, in the form of a dowel or pin is mounted in apertures **61.0045** on the support flange **61.002** which are located between the slot **61.005** and a free end **61.0051** of the support flange **61.002**. The bracket **64.003**, as illustrated in FIG. **64** which engages the aperture mounted bracket supports **61.004** will have a wider rear portion than the previously described brackets, because the location of the pin is closer to the free end of the support flange. This difference in dimension of the rear portion of the bracket is visible in FIG. **64**, where the upper brackets have this wider feature, while the lower brackets, as described in earlier Figures, engages bracket supports **64.111**, as described above, which are received in the slots **61.005**.

A feature of the racking system of FIGS. **61** to **64** is that if desired, by the positioning of two pins or dowels **61.004** in the two apertures **61.0045** provided, will mean an increase in the rigidity of the bracket **64.003**, because the slot on the bracket will not be able to function to contribute to the elasticity and or damping means, however, this will not impact the elasticity, or suspension or damping contribution provided by the land of the support flange containing the bracket support.

Illustrated in FIG. **63** is a dual support flange **63.002** with a multiple support bracket, such as illustrated in FIG. **10**, assembled thereto. One the bracket member is shown a surf board being supported thereby, and illustrates how one or more dowels or pin are mounted in the appropriate apertures **63.0045** on the support flange **63.002** which are located between the slots **63.005** and free ends **63.0051** of the support flanges **63.002**. Further a second aperture **63.0045** is utilised as part of a locking system whereby a wire rope with looped ends is passed through the second aperture **63.0045** and locked to the surfboard by means of a fin box cleat and a pad lock **63.00452**.

Illustrated in FIG. **65** is a twin bracket version of the support flange of FIGS. **61** to **64** with the bracket support pin or dowel extending between the twin support flanges.

If desired more than two bracket support apertures can be provided to the support flange

As in previous embodiments, the rear of the bracket makes contact with a rear support plate or wall means to which the support flange or flanges are attached.

In the systems of FIGS. **61** to **65** the bracket support dowel or pin is removable and re-usable, however if desired the dowels, one or more can be integrally formed with the support flanges or permanently attached thereto.

In the rack systems of FIGS. **61** to **65** the slot or slots in the support flanges, whether or not they receive a bracket support pin or dowel, will still contribute to the elasticity, or suspension or damping system of the racking system.

Illustrated in FIGS. **66** to **71** is another racking system which utilises brackets similar to those described above with the vertical apertures discussed at FIGS. **11** and **12**, with several differences. The main difference is that the bracket supports and pins or dowels are not utilised. Instead, as is illustrated in FIGS. **68**, **70** and **71**, a front panel **66.932** which has an array of rectangular shaped slots **68.933**, which provides communicable passage to a space **68.934** which is locate at the rear of the panel **66.932**. The space **68.934** is formed between the rear of panel **69.932** and the wall plate **68.935** by means of the side members **68.936**. In this instance the wall plate **68.935**, which in this instance is the means to secure the support formation (comprising the front panel **68.932**, side members **68.936** and wall plate **68.935**) to a wall or wall means such as a stand frame etc. The wall plate **68.935** can, if desired, be absent in which case the front panel **68.932** and side members **68.936** can be secured direct to a wall or wall means such as a wall or frame of a stand.

As is illustrated best in FIG. **67** the bracket has its own downwardly directed slot **67.013** which spaces the rear tongue **67.008** away from the rest of the bracket. The rear tongue **67.008** has a width which is approximately equal to the width of the space **67.934**, and this geometry together with the slot **67.013** having its forward edge distanced from the external face of the panel **67.932** will ensure that the forward end of the bracket will provide some elasticity, suspension or damping qualities, in order to decrease the impulse (force divided by time) by increasing the time that it takes to bring an object stored on the bracket to rest. This effect like previous brackets depends upon the ability of the material of the bracket on the outer side of the slot **6.013** being able to move relative to the tongue **67.008**.

As can be seen in FIGS. **68**, **70** and **71** the support formations are provided with an array of slots **68.933**, **70.933** and **71.933**, so that a multiplicity of brackets and flexibility of their use can be provided. In FIG. **70**, a single support formation carries the panel **70.932** and is wide enough to have two brackets engaged in respective slots, thereby allowing support of articles. Whereas in FIGS. **68** and **71**, there are provided only three columns in the array, and if long objects need to be supported then tow support formations, as depicted in FIG. **71** will need to be utilised.

Illustrated in FIGS. **72** and **73** is a removable support means that is able to engage with slots **68.933**, **70.933** and **71.933** in a wall or attached to a wall. The removable support means is made up of two support flanges **72.202**, a support plate **72.201**, a support hook **72.200** and a bracket support **72.204**. The support flanges **72.202** and the support plate **72.201** form a U shape with a channel bounded by the support flanges **72.202** and the support plate **72.201**. The support hook **72.200** includes a horizontal member **72.231** and a vertical member **72.232**. The support hook **72.200** can be inserted into the slots **68.933**, **70.933** and **71.933** with the vertical member **72.232** entering the space **68.934** and the horizontal member **72.231** extending through a rear panel such as **69.932**. The distance **72.220** is approximately equivalent to the thickness of the rear panel through which it extends such as **69.932**.

When the support hook **72.200** is engaged in a slot the support plate **72.201** rests against the external face of the panel **67.932**. The bracket support **72.204** is engaged between the two support flanges **72.202** and is able to receive a bracket that contains a slot such as shown in FIGS. **9** and **10**. The bracket support can be fixed or removable. Where a bifurcated bracket is used two removable support means **72.199** will be required. The distance **72.210** between the inside faces of the support flanges is approximately equivalent to the thickness of a bracket support **2.024**. The bracket engages with the removable support means **72.199** in the same way as been described above for other embodiments of the racking system.

Illustrated in FIGS. **74** and **75** is a removable support means **74.198** similar to **72.199**. The difference being that the bracket support in the form of a pin is not used, instead an upwardly directed slot **74.211** in the support flanges **74.202** is used. The upwardly directed slot **74.211** is able to receive a bracket support such as the one illustrated in FIG. **21**. The bracket support is inserted through the opening **74.207** and rests in the terminus **74.205**. When resting in the terminus the bracket support can engage a bracket in the same manner as has been described above. The distance **74.206** is approximately equivalent to the width or diameter of the bracket support. The upwardly directed slot as shown can be replaced with a slot of different dimensions such as those of slot **1.005**.

The removable support means **72.199**, **73.199**, **74.198** and **75.198** illustrated between FIGS. **72** to **75** are illustrated with only 2 support flanges, however if desired they may include 1 support flange or more than 2 support flanges.

FIGS. **76** to **94** illustrate a bracket **76.006** for supporting a watercraft such as a kayak, surf ski, surfboard, canoe, sail board, wind surfing board, small run about or other watercraft in a cantilever manner with the use of straps. The brackets differ from each other in the form of straps that they use, which will be further described throughout the description. FIG. **95** illustrates a possible support means. FIGS. **99** to **102** illustrate a bracket for supporting a watercraft that is angularly adjustable.

In one embodiment the bracket as illustrated in FIGS. **76** to **101** can be used in the racking system as described above.

FIG. **76** illustrates a bracket **76.006** prior to being fitted with a strap. The bracket includes a load bearing edge **76.062**, a top edge **76.153**, a bottom edge **76.154** and a front edge **76.056**. The bracket extends from the load bearing edge **76.062** to the distal front edge **76.056** to receive a watercraft on the top edge **76.153**. The top edge **76.153** includes at a medial region a depression or recess **76.411** that has a somewhat U shaped profile to receive the hull of a watercraft. In use generally at least two brackets are used supporting a watercraft at, at least two points.

FIG. **81** illustrates the manner in which the bracket **81.006** is supported by engaging with a support member **81.035** through the use of support means **81.004** held in a slot **81.005** in a support flange **81.001** attached to a support plate **81.010**. It is readily envisaged that the support plate **81.010** can be either a plate or the structure against which the support member **81.035** is attached. FIG. **78** illustrates the support means **78.004** as being in the form of a pin or rod. The apertures **76.116** receive and engage the support means **78.004** and acts as the fixing point for the bracket **76.006** to the support

member. FIG. **81** illustrates the bracket **81.006** being engaged with the racking system described above in previous embodiments.

The bracket **76.006** include apertures **76.116** open on two opposite faces of the bracket that are located proximate to the load bearing edge **76.062** and the top edge **76.153**. The apertures **76.116** are able to receive a support means in the form of a pin or rod that extends in both directions laterally beyond the face **76.160** of the bracket.

A slot **76.013** extends from the bottom edge **76.154** proximate to the load bearing edge **76.062** generally parallel to the load bearing edge. As an alternative to one of the apertures **76.116** the slot **76.013** is able to receive a support means as illustrated in FIG. **21** in the form of a flanged pin to engage with a support member as described above. When the bracket is loaded with a water craft the slot **76.013** can flex to dampen the force from loading the watercraft as described above for FIGS. **11** and **12**.

The bracket **76.006** along its front edge **76.056** includes an open faced aperture **76.117** able to receive additional materials such as an oar, paddle or fishing rod. The aperture **76.117** includes a restraining edge **76.118** that acts to hold the additional material in place.

The top edge **76.153** at the entrances of the U shaped medial region **76.011** includes at least one slot **76.119** ending in an aperture **76.007**. Illustrated in FIG. **76** there are two slots **76.119** and two apertures **76.007**, one of each at the distal and proximal ends of the U shaped medial regions entrance. The slot **76.119** receives a strap that extends over the medial region **76.011** with a U shaped profile and the aperture **76.007** receives a strap engaging pin that is fixed to the strap and is further described below.

FIGS. **77** and **78** illustrate a bracket for supporting a watercraft **77.006** and **78.006** that includes a strap **78.113** across the U shaped medial region **78.011**. The strap **78.113** can be made of rubber, cloth, webbing, synthetic fibres or a variety of other materials readily understood by the skilled addressee. The strap **78.113** is fixed in two places to the top edge **78.153** of the bracket **78.001** proximate to the entrance to the U shaped medial region **78.011**. The strap **78.113** is fixed at points **78.121**. Points **78.121** can be screwed, pinned, glued, bonded or integrally formed with the top edge **78.153**. In this embodiment the strap **78.113** is of a fixed length. When fixed in place and a water craft is loaded onto the bracket **78.006** the strap **78.113** acts to dampen the force of the hull of the watercraft contacting the bracket **78.001**. Additionally when loaded the straps help to absorb any external forces applied to the watercraft or bracket. For example a force applied when the bracket or watercraft is bumped, or when the watercraft is adjusted or if the watercraft is being transported while being loaded on the bracket **78.001**. The front edge **78.056** includes a T section **78.219** on the top edge **78.153** that extends laterally beyond both faces **78.160** of the bracket **78.006**.

In this embodiment the aperture **77.007** and **78.007** includes a strap engaging pin **77.215** and **78.215** which is not engaged with the strap **77.113** and **78.113**.

FIGS. **79** and **80** illustrate a bracket **79.006** and **80.006** for supporting a watercraft that includes an adjustable strap **79.114** and **80.114**. The strap **79.114** and **80.114** includes an adjustment means including a ladder lock or slide adjuster **79.129** and **80.129** to adjust the length of the strap **79.114** and **80.114**. The strap **79.114** and **80.114** engages with bracket **79.006** and **80.006** through the use of strap engaging pins **79.215** and **80.215**. The ends of the strap **79.114** and **80.114** can be fixed to a strap engaging pin **79.215** and **80.215** or can be removably engageable with the strap engaging pin. The strap engaging pin **79.215** and **80.215** is inserted into an aperture **79.007** and **80.007** proximate to the entrance to the U shaped medial region **79.411** and **80.411** of the top edge **79.153** and **80.153**. A slot **79.119** and **80.119** extends from the top edge near the entrance to the U shaped medial region **79.411** and **80.411** which is wide enough to hold the strap **79.114** and **80.114** but is not wide enough to allow the strap engaging pin **79.215** and **80.215** to pass through. When a hull is loaded onto the strap **79.114** and **80.114** the resultant force pulls the strap engaging pin **79.215** and **80.215** towards the centre of the U shaped medial region **79.411** and **80.411** which are restrained by the width of the slot **79.119** and **80.119**. The length of the strap **79.114** and **80.114** can be adjusted using an adjustment mechanism such as ladder lock or slide adjuster **79.129** and **80.129** allowing a loaded watercraft to sit lower in the U shaped medial region **79.011** and **80.011** with a longer strap **79.114** and **80.114** length.

The strap engaging pins **79.215** and **80.215** can be locked within the aperture **79.007** and **80.007** or can be removable. When removable the strap engaging pins can optionally include locking means such as a cap flange **79.158**. The cap flange **80.158** can be may be removably connected by a thread system, or clip system or integrally formed therewith or permanently fixed to the pin by thread and glue, or simply glued or attached by any other appropriate means.

FIG. **81** illustrates a bracket **81.006** for supporting a watercraft engaged in a support member **81.035** as described above between FIGS. **1** and **60**. The bracket engages the flange in the same way as the bracket described between FIGS. **1** and **60** and is numbered accordingly. The strap **81.114** includes a ladder lock or slide adjuster **81.129** to allow the strap **81.114** to be lengthened and shortened. The strap engaging pin located proximal to the load bearing edge of the bracket does not need a cap flange **81.158** and does not need to be fixed in the aperture for receiving it as the receiving flanges **81.001** act to fix the strap receiving pin in place.

The wall to which the rack system is attached can be a stationary wall such as found in a building. However if desired, the wall can be part of a frame or stand upon which the racking system is to be mounted, with such a frame or stand being free standing or wheel mounted for easy movement and re-positioning.

FIGS. **82** and **83** illustrate a bracket with an extended strap **82.076**, **83.076** and a cam cleat **82.185**, **83.185** locking mechanism on the front edge **82.056** for locking the extended strap **82.076**. The cam cleat rotates around a point **83.189** to lock and unlock the strap **82.076**, **83.076**. The top edge **82.153**, **83.153** includes a T section **82.219** at the front edge **82.056** that that extends laterally from the face **82.160**, **83.160** in both directions and is used to fix the toothed cam cleat on the front face **82.056**. The extended strap **82.076** on the front tope edge **82.153** lies over the T section **82.219** and passes through the cam cleat **82.185** which stops the strap **82.076** lengthening over the U shaped medial region **82.011** when locked. A hanging section **82.081** of the strap **82.076** hangs past the cam cleat **82.185** and terminates in a T bar **82.216**. The T bar **82.216** acts as a grip and to set the maximum length to which the strap **82.076** can lengthen over the U shaped medial region **82.011**.

Where the term capped flange has been used to describe the flanges on the end of a bracket support it does not restrict the shape of the flange to being circular as depicted in the drawings. The disc flange can be of any profile that is larger than the aperture in the bracket support and the width of the flange slots.

FIGS. **84** and **85** illustrate a bracket similar to that in FIGS. **82** and **83** with like parts being like numbered. In FIGS. **84** and **85**, the cam cleat is fixed on top of the T section **84.219**, **85.219**.

FIGS. **86** and **87** illustrate a bracket as in FIGS. **82** to **85** with an apertured bracket **86.197**, **87.197** instead of a cam cleat. The strap **86.076**, **87.076** cannot be locked in a variety of positions in this embodiment. The strap **86.076**, **87.076** passes through an aperture **87.699** in the bracket **86.197**. When a water craft is loaded on the bracket the strap **86.076**, **87.076** will lengthen in the U shaped medial region **86.011**, **87.011** and shorten in the hanging section **86.081**, **87.081**. The T bar **86.216** is longer than the aperture **87.699** in the apertured bracket **86.197**, **87.197** so that when the bracket **86.001**, **87.001** is loaded with a watercraft the apertured bracket **86.197**, **87.197** will act to stop the T bar **186.216**, **87.216** raising further, limiting the length of the strap **86.076** in the U shaped medial region **86.011**.

FIGS. **88** and **89** illustrate a bracket as in FIGS. **86** to **87** with a tightening barrel **88.605**. The end of the strap **89.076** is fixed or engageable with the centre section **89.115** of the tightening barrel **89.605**. The tightening barrel includes end flanges **89.109** that project partially over the side face **88.161**, **89.161**, that act as ratchet members. A pivoting locking member **88.610** is fixed to the side face **88.161**, **89.161** at a pivot point **88.611**, **89.611**. The locking member **88.610**, **89.610** engages with a toothed edge **88.112** of the end flange and has handles **88.607**, **89.607**. When the strap **89.076** is engaged with the tightening barrel **88.605**, **89.605** the end flange **88.109** can be rotated causing the strap **188.076**, **89.076** to roll up around the tightening barrel **88.605**, **89.605**, shortening the strap **88.076**, **89.076** resulting in a loaded water craft sitting higher in the U shaped medial region **88.011**, **89.011**. One or both end flanges **88.109**, **89.109** can include a toothed edge. And one or both side faces **88.161**, **89.161** can include a locking member **88.610**, **89.105**. When engaged with a toothed edge **88.109**, **89.109** of the tightening barrel the locking member **88.610**, **89.610** acts to lock the strap **88.076**, **89.076** in the rolled up position.

FIGS. **90** and **91** illustrate a bracket **90.006** and **91.006** for supporting a watercraft as described above with a different strap arrangement. FIG. **90** illustrates a single piece adjustable strap **90.777** that will fit into the aperture **90.007** and slot **90.119** as described in the above embodiments such as in FIG. **79**. The single piece adjustable strap enters the slot **90.119** at the opening **90.222** and then wraps around the engaging pin **90.215** and then exits the slot **90.119**. The load bearing end **90.555** of the strap and the free end **90.666** of the strap when the bracket is unloaded can be lengthened or shortened to give the strap **90.777** different lengths across the middle section **90.411**. When a watercraft is loaded onto the strap **90.777** the load bearing end **90.555** pushes down on the free end **90.666**, effectively locking both in place, stopping both the load bearing end **90.555** and the free end **90.666** from being shortened or lengthened.

FIG. **91** illustrates a bracket **91.006** similar to that illustrated in FIG. **90**. Instead of the generally straight slot **90.119** illustrated in FIG. **90** a tapered slot **91.333** extends into the aperture **91.007**. This results in the same operation as described in FIG. **90** with the locking of the load bearing end **90.555** and the free end **90.666** being further localised at the opening **90.222**. Other arrangements of the slot and opening can be used to aid in locking the strap in place when loaded.

FIG. **92** illustrates a bracket **92.006** for supporting a watercraft with a U shaped medial region **92.011**, supporting means **92.004** and an aperture **92.117** as described in the above embodiments. An inflatable bladder **92.167** is used in the same way as the strap described in the above embodiments. The bladder **92.167** is engaged with a strap engaging pin **92.215** in the same way as described for the strap in the above embodiments. Illustrated is the bladder **92.167** engaged with a strap engaging pin at only the end proximal the load bearing edge **92.062** but the bladder can be fixed to the top edge **92.153** in any of the manners described in the above embodiments. The bladder **92.167** is illustrated as being inflated allowing it to absorb more force than if it were deflated.

FIG. **93** illustrates a bracket **93.001** as in FIG. **93** where the bladder **93.167** is fixed at both ends of the U shaped medial region **93.011** with the use of strap engaging pins **93.215**. The bladder **93.167** is illustrated as deflated and a valve **92.0173** can be used to inflate the bladder **93.167** with inflating material.

FIG. **94** illustrates a bracket **94.006** as in FIG. **91** where the bladder **94.167** overlies a webbing material **94.068**, or includes it along its lengthwise edges. The webbing allows the bladder to support a larger surface area of the hull of the watercraft, better distributing the force applied to the bladder **94.167**.

FIG. **95** illustrates a bracket **95.006** as in FIGS. **92** and **93** where the bladder **95.167** is fixed to the top edge of the bracket along the length of the U shaped medial region **95.011**. In this arrangement the watercraft is able to sit as low as possible proximate to the top edge **95.062** along the length of the U shaped medial region **95.011**. When inflated the bladder absorbs forces applied to the bracket from the watercraft.

FIG. **96** illustrates a bracket **96.006** as in FIGS. **92** and **93** where the bladder **96.167** is highly inflated.

The bladders described above can be inflated with air, water, any other appropriate shock absorbing gas or any other appropriate shock absorbing fluid.

FIGS. **97** to **101** illustrate a bracket **97.604** for supporting a watercraft that is angularly adjustable in a support member. The bracket **97.604** includes three support apertures, **97.193**, **97.194** and **97.195** able to receive a support means like **97.691**. Support aperture **97.691** engages a slot **98.005** in a support member **98.035** as in the above embodiments. The bracket **97.604** can be used without a pin being placed in apertures **97.193**, **97.194** and **97.195**. If one of the apertures **97.193**, **97.194** and **97.195** receives a pin, the pin sets the angle at which the bracket **97.004** will sit, with each aperture **97.193**, **97.194** and **97.195** providing a different angular position, or a range of angular displacement in relation to the back wall **98.064** of the support member **98.035**. The end support **97.297** acts to restrain the watercraft when the bracket **97.004** is in an angled position.

FIGS. **97** to **101** illustrate the top edge **97.153** of the bracket **97.004** as being formed in the same shape as the hull **97.177** of the watercraft with which the bracket **97.004** can be used. For other hull shapes other profiles of bracket would be used.

FIG. **98** illustrates when none of apertures **97.093**, **97.094** or **97.195** are fitted with a support means **98.691**. The load bearing wall **98.062** of the bracket experiences no angular displacement and acts as the load bearing point with support means **98.691**. In this position less space is taken up in the direction perpendicular to the support member **98.035**. The watercraft is held in place by the top edge **98.153** being shaped in the profile of the hull **98.177** of the watercraft and the end support **98.297**.

FIG. **99** illustrates the bracket of FIGS. **97** and **98** where aperture **99.193** receives a support pin giving the bracket the maximum angular displacement **99.100** from the rear wall **99.064** of the support member **99.035**.

FIG. **100** illustrates the bracket of FIGS. **97** to **99** where aperture **9100.195** receives a support pin giving the bracket minimum angular displacement **100.100** from the rear wall **100.064** of the support member **100.035**.

FIG. **101** illustrates the bracket of FIGS. **97** to **100** where aperture **101.194** receives a support pin giving the bracket an intermediate angular displacement **101.100** from the rear wall **101.064** of the support member **101.035**.

The apertures **101.193**, **101.194** and **101.195** are separated so as to give the different angular displacements discussed above. This separation in one embodiment can lie on the circumference of a circle.

FIG. **102** illustrates an arrangement similar to FIGS. **96** to **101** with a bracket **102.008** that does not have a top edge **102.153** that contours to the hull of the watercraft. It has a somewhat U shaped medial region **102.011**.

FIG. **103** illustrates the arrangement of FIGS. **96** to **102** where a bracket **103.102** has a flat top **103.153** and a hooked end section **103.103**.

The brackets shown in FIGS. **76** to **103** are shown being used with the racking system of the previously described embodiments. However, it will be readily understood the bracket improvements in FIGS. **76** to **103** can be used with other bracket support systems, and are not restricted to the racking systems described above.

FIGS. **104** to **109** illustrate a support panel **104.700** that can be used as a wall or ceiling panel or floor panel. The panel **104.700** can be a substrate under a wall or ceiling panel or it can be a stand alone panel as will be described below.

The rear face **104.706** of the support panel **104.700** can lie against a wall or a ceiling or floor or it can be freestanding between a ceiling and a floor to form a vertically arranged panel or between two walls or two supports to form a hanging panel, or can be mounted to a base so as to form a a free standing panel.

The support panel **104.700** includes an array of apertures **104.704** which pass entirely through the thickness **104.710** of the panel **104.700** between the rear face **104.706** and the front face **104.708**. The rear face **104.706** of the support panel **104.700** also has rear channels such as rebates or rebated grooves **104.702**. The purpose of these rebated grooves will be discussed below.

The front face **104.708** might also include a groove or recess **104.718** (short and horizontal) and **104.720** (short and vertical) and recesses **104.713** (full panel length or width vertical or horizontal) and **104.716** (rectangular). In these grooves or recesses on the front face, the apertures **104.704** also pass through the reduced thickness **104.717** of the support panel **104.700** to the rear channel **104.702**. Alternatively, the front channels or recesses can be formed by parallel ribs **104.799**, in which case the thickness of the panel need not be reduced, however this is not as aesthetically pleasing or as easy to manufacture as channels or recesses formed by removing material.

Where the rear face **104.706** includes a rear channel **104.702**, a bracket such as described below in FIGS. **110** to **131** can be positioned through the apertures **104.704** so that a hooked portion sits inside the channel or recess **104.702** as is described further below. Brackets or other support members and support structures when mounted in the apertures **104.704** in front face recesses **104.717**, and of a width similar to the width of the recess **104.717**, will be restricted in lateral movement by the channel side walls **104.712**. Whereas the front face recesses **104.716**, **104.718** and **104.720** are illustrative only and the shape of the recesses can be made to suit any attachment fitted to support panel **104.700**. The function of the recesses **104.716**, **104.718** and **104.720** is that they able to receive within them the periphery of a panel or an article or cabinet which is to be mounted by a bracket (as explained below) to the panel **104.700**.

As an indication of the dimensions of the features on the panel **104.700** the apertures **104.704** have a height of 50 mm and a width of 25.5 mm, which has been selected so as to allow the portions **74.232** or **119.720** to readily pass through the aperture **104.704** while the portions **74.232** or **119.720** are generally parallel to the front surface of the panel **104.700**.The rear channels or rebates **104.702** have a width of 26 mm while the walls of the channel or rebate are approx 4 mm in depth. The panel **104.700** is of the order of 2400 mm×1200 mm and of the order of 25 mm thick before the rear recess, channel or rebate is formed.

As illustrated in FIG. **105**, the rear channels or rebate **105.702** can run the entire length of the support panel **105.700**. The rear channel or rebate **105.702** has a base surface **105.225** which extends between apertures **105.704** and thereby provides a recess which intersects with the wall of the aperture at two opposed sides of the aperture. Further, when the support panel **105.700** is used as a wall the rear channel base surface **105.225** includes a region above and adjacent **105.714** the aperture and a region below and adjacent **105.723** the aperture **105.704**. The reduced thickness through wall **105.729** abuts a support member's hanging arm as described below. The rear channels or rebate **105.702** can be limited to a region surrounding the apertures **105.704** as shown in FIGS. **106** at **106.701**, **106.703** and **106.705**. If the panel is made with a predetermined directionality the recesses can be located on one side only of the apertures. The profile of the rear face **104.706** recesses will depend on the type and orientation of the support member used.

The recesses **104.718** and **104.720** are offset or spaced from the apertures **104.704**. A top or side member of an article, such as a cabinet, or shelf or other article of furniture or building element, can be inserted into the recess **104.718** or **104.720** which restricts lateral movement of the article. The top or side member of the article extends further than the other members of the support structure in the direction of the support panel **104.700**.

FIG. **106** illustrates the rear face **106.706** of the support panel **106.700** with a variety of different rear recess profiles **106.702**, **106.703**, **106.701**, **106.705** and **106.899** adjacent the respective apertures **106.704**. It will be understood that during manufacture only one of these recess types would be selected, but if desired more than one could be used.

Rear channel **106.702** and recess **106.701** are used when the support member has a locking member in the direction of the channel **106.702** or recess **106.701**. Recess **106.703** can be used when the foot print of the support member to be used is at right angles to rear channel **106.702** and recess **106.701**. Recess **106.705** allows use of a support member that has a lock member that can be in any direction or more than one direction. The channel contains a rear channel base surface **106.725** and the rear recesses have rear recess base surfaces **106.743**. If desired the rear channels or recesses can be formed by parallel ribs **106.899**, in which case the thickness of the panel need not be reduced, however this is not as aesthetically pleasing or as easy to manufacture as channels or recesses formed by removing material.

FIG. **107** illustrates a support panel **107.700** with both front channels **107.713** and rear recesses **107.796**, **107.702**, **107.755** and **107.775**. The front recesses **107.713** are channel shaped with a base and two side, to receive shaped hanging units and will be such that they are restricted from lateral movement, or held more rigidly to the panel, by the regions **107.712**. The thickness **107.717** of the support panel **107.700**

is reduced between the front base surface **107.711** and the rear channel base surface **106.725**, which will require a decrease in the length of arm of a bracket such as arm **119.722**. While the panel **107.700** shows a rear face and the front face on the other side, it will be readily understood that the panel **107.700** could be used in reverse, that is the rear side used as the front side and the front side as the rear side. It will also be understood that in FIGS. **106** and **107** the variety of shapes an orientations of apertures are provided for illustrative purposes only, and generally one would be provided with one type and or orientation, or more if desired depending upon a customers requirements.

FIG. **108** illustrates a support panel **108.700** where the aperture **108.704** in the rear channel **108.702** includes a radiused edge **108.719** along its walls with reduced thickness **108.543**. The rear of the panel illustrated in FIG. **108** is best used with a support member such as that illustrated in FIG. **114**, where there are hook elements which require a degree of rotation. The radiused edge **108.719** curves from the reduced thickness wall **107.729** into the rear base surface **107.725**. The radiused edges are located at opposed areas which lead into the aperture **108.704**. When the support panel is placed against a wall the radiused edge allows an inserted support member to rotate, the arc of rotation moving towards the wall and still being able to be inserted into the channel **108.702**.

FIG. **109** illustrates how a variety of different sized panels **109.790**, **109.791**, **109.793**, **109.794**, **109.785**, **109.783** and **109.797** can be assembled and secured near to each other so as to form an array of apertures. The arrangements of apertures **109.704** shown in these Figures are only illustrative and a variety of different arrangements can be used to suit the desired location of a supported unit as would be readily understood by a skilled addressee. It will be noted that the horizontal spacing between the vertical edges of the panels and the apertures on respective panels are such that the resultant spacing between adjacent columns of apertures on adjacent panels is at the same spacing as adjacent columns on the same panel. Similarly with spacing between the horizontal edges of the panels and the apertures on respective panels are such that the resultant vertical spacing between adjacent rows of apertures on adjacent panels is at the same spacing as adjacent rows on the same panel.

The support panels can be made from any suitable material to carry the load and weight of articles which will be transmitted to the panel. For example if polymer panel, such as an expanded PVC sheet marketed under the name of NEMA is used, as this can be purchased in a variety of densities and grades, with different thicknesses and strengths, an appropriate grade, density and strength of sheet is selected depending upon whether the panel is to carry furniture such as cabinets or shelving, or whether it is to support a building elements such as stair treads or beams.

FIG. **110** illustrates a spring support member or bracket **110.721** for use with a support panel **104.700**. The bracket **110.721** includes a base **110.730** having an aperture **110.728** that can optionally be threaded, radiused regions **110.726** that extend from the base **110.730**, hanging arms **110.722** extending from the radiused regions distal to the base **110.730** and locking members **110.720** extending perpendicularly from the distal end of said hanging arms **110.722**.

When engaging a support panel such as **104.700** the locking members **110.720** are brought closer together, against the bias provided by the radiused regions **110.726**, thereby reducing the distance **110.389** between the outer extremities of hanging arms **110.722**. When the distance **10.389** is less that the length of the aperture **104.410** the locking members **110.720** are inserted through the aperture **104.700**. Once inserted through the aperture **104.704**, the radiused regions **110.726** are released leaving the locking members **110.720** to rotate into engagement with the base of the rear channel **106.711** or base of the rear recess **106.725**, so that the locking members **110.720** are positioned in the channel or recess and the arms **110.722** rest against or near to the opposed ends of the aperture **104.704**, whereby the distance between the arms **110.722** is the same as the aperture length **104.410**.

FIG. **111** illustrates a bracket similar to FIG. **110**, with a spring support member **111.731** as illustrated in FIG. **110** however it differs in that a bolt **111.740** is fitted between the radiused regions **111.726**. The bolt can be tightened and loosened with a nut **111.733** to alter the distance **111.747** between the hanging arms.

FIG. **112** illustrates the bracket of FIG. **111** with a bar **112.735** attached to the base **112.730** of the bracket **112.741**. The bar **112.735** is fixed to the aperture **112.728** in the base **112.730** and can be screwed, clipped, pinned, riveted, or integrally formed with the aperture **112.728**. The distal end of the bar **112.735** has a ring **112.936** with a ring aperture **112.737** to which other things can be attached.

FIG. **113** illustrates a spring support member **113.739** similar to that of FIG. **110**, which includes a bar or shaft **113.735**.

FIG. **114** illustrates an opposed U or X shaped bracket **114.751** with the profile of an inverted bowler hat on top of a bowler hat profile. The bowler hat profiles are attached along the crown of each bowler hat. The band regions **114.752** of each bowler hat terminates in the brim **114.720** regions. The brim region **114.720** of the inverted bowler hat profile operates in the same way as the locking member **110.720** as described above. Illustrated is a hinge **114.750** in the middle of the crown section that allows the distance **114.749** to be altered so that when reduced the brim or locking member **114.720** can pass through the aperture and abut the rear channel base surface **106.725** or rear recess base surface **106.743** in the same manner as discussed above in FIGS. **110** to **113**. The support member **114.751** as being split at the hinge **114.750** so as to provide a hinge action whereby forces which draw the lower ends together will force the upper ends apart. Thus as load on the bracket produces this effect, the greater the load the greater will be the brackets engagement force with the panel.

FIG. **115** illustrates an box shaped support member or bracket **115.769** made up of two box sections **115.762** and **115.760** capped on one end **115.425** and which telescope with respect to each other. Attached to one of the sections **115.762** or **115760** is a hook member **115.756** which can be used to suspend articles to be stored. The hanging arms **115.722** and locking members **115.720** operate in the same manner in respect to the support panel **104.700** as for the previously mentioned support members.

The smaller open box member **115.760** can slide within the larger open box section **115.762** to alter the distance **115.747** between the hanging arms. The slot **115.758** passes through two opposite faces of both open box sections **115.762** and **115.760** and are alignable. When the slots align the distance between the hanging arms **115.747** leaves the hanging arms abutting the walls of the aperture in the support panel with the distance equal to the length of the aperture **104.410** and the locking member abutting the rear channel base surface **16.725** or rear recess base surface **16.743**. When in this position a pin, clip, bolt or other lock can be placed through the slots, preventing the distance **115.747** from altering. The hanging arms are illustrated as extending from the capped end **115.425** of the box section, but can be fixed at any point along the base of the box section with the slots **115.758** being placed at a appropriate position to allow the hanging arms **115.747** to

be the correct distance apart. If desired, within the box sections **115.762** and **115.760** there can be located a compression spring so that the arms **115.722** are forced apart, and that an operator must compress the box sections against this bias.

FIGS. **116** and **116**A illustrate two beam support members **116.759** and **116.779**. In FIG. **116**A and **117** is illustrated a beam support member **116.759** where the beam **116.780** is inserted into two tube sections **116.761** at either end of the beam **116.780**. The tube sections include a hanging arm **116.722** that can be inserted through an aperture in a support panel **106.704**, and a locking member **116.720** to abut the rear channel base surface **106.725** or the rear recess base surface **106.743**. The two tube sections **116.720** can be slide along the length of the beam until the desired position is located and then inserted and fixed in the apertures **106.704**. the tube sections **116.761** can be open tubes in which cased the beam **116.780** can be any appropriate length, or they can be closed at their outside ends, in which case the length of the beam **116.780** will need to be set for the spacing of the tube sections **116.761**. To lock the tube sections **116.761** in position along the length of the beam, locking aperture **116.764** can be used to insert a screw or bolt, screwing onto the beam locking the tube section **116.761** in place. The beam **116.780** can optionally have apertures along the length of it through which a screw or bolt can pass or a screw or bolt can friction lock against the face of the beam **116.780**. FIGS. **116**A and **118** illustrate an member **116.779** similar to the member **116.759** of FIG. **116**, where a two plate section **116.763** is used instead of a tube section **116.761**. The two plate section **116.763** uses a plate **116.766** on two opposite sides of the beam **116.780** connected by a angled hanging plate **116.768**. The beam **116.780** can slide and be secured between the two plate sections **116.763** in the same way as in **116.759**.

FIG. **125** illustrates the support panel of FIGS. **104** and shows how the brackets of FIGS. **113**, **116**, **117**, **116**A and **118** are mounted thereto via apertures **125.704**.

FIGS. **119**, **119**A, **120**, **120**A, **123**, **123**A, **126**, **126**A and **124** is a hanging system **119.771** for supporting a variety of articles or support structures that are fixed to a beam **119.780**. The articles can be a cabinets, shelves, drawers, cupboards, chairs, stools, vanities, wall units, stereo units or other furniture, or building elements such as beams or stair treads, or other articles such as art works to be mounted to a panel. A generally triangular shaped bracket supporting plate **119.770** includes a back surface **119.744** if made as a solid bracket or is two edges if fabricated from sheet material. The back surface **119.744** abuts the support panel **106.700** and transfers the load from the attached article. The upper surface of the bracket **119.770** includes a three sided cut-out or recess **119.322**, with the middle side serving as a bearing surface to receive the load transferred by the beam **119.780**, which can be received therein. This middle side also allows the beam **119.780** to translate along it as discussed below. The hanging arms **119.722** and locking member **119.720** operate in the same manner as described above. A lateral reinforcement or projection **119.786** is provided in the case where there is no front recess on the panels. This projection will sit in an aperture **106.704** below the aperture **106.704** in which the hanging arm **119.722** and locking member **119.720** engage with. The projection **119.786** prevents the lower end of the bracket moving laterally after assembly. If desired the projection **119.786** can be replaced by a second hanging arm and lock member similar to **119.722** and **119.720**.

A machine screw or bolt **119.772** is used to alter the distance **119.784** which positions the support beam **119.780** relative to the bracket and the panel, allowing the article, which is attached to the support beam and held on the supporting plate **119.770**, to be pushed with a compressive force against the support panel **120.700** and thus held tightly.

In FIGS. **120** and **120**A, the support panel **120.700** is shown in cross section. In FIG. **120** is a partially assembled system, with the hanging arm **120.722** passing through the aperture **120.704** and abutting a wall of the aperture. The locking member **120.720** has also passed through the aperture **120.704** and is shown near to the rear channel base surface **120.725** and prior to engaging with the rear channel base surface **120.725**. The projection **120.786** is shown in the upper portion of an adjacent. FIG. **120**A a fully assembled system with the hanging system **120**A.**771** engaged with the rear channel base surface **120**A.**725**.

The width and length of member **119.720** and of the hanging arm **119.722** is such that they fit reasonably snugly into the width of the rear rebate or recess **104.702** and the aperture **104.704**. As the rebate **104.702** has side walls, the length of the member **119.720** will resist twisting of the bracket **119.771** relative to the panel **104.700** around an axis of rotation perpendicular to the panel **104.700**, which is in addition to the resistance to such movement provided by the projection **119.786**. Whereas the width of the arm **119.722** will assist in resisting twisting of the bracket **119.771** about a vertical axis. Further the distance **119.943** between the back edge/surface **119.744** and the inner face **119.724** of member **119.720**, as illustrated in FIG. **119**, is selected so that the arm **119.722** can enter the aperture **104.704** (as discussed below) and when the back edge/surface **119.744** is adjacent the front face of panel **104.700**, then the inner face **119.724** of member **119.720** is clear of the base surface **105.725** of the recess/rebate **104.702**.

In FIGS. **123**, **123**A, **126** and **126**A there is illustrated a shelf or portion of an article of furniture, or a building element **123.853** to which beam **123.780** is attached. FIGS. **123** and **126** illustrate the system before full assembly, in that the screw **123.772**, **126.772** has not yet been tightened, that is gap **123.884**, **126.884** is smaller than the gap **123**A.**885**, **126**A.**885** respectively. By tightening the screw **123.772**, the beam **123**A.**780** is moved toward the support panel and by this means the screw will apply a clamping force to keep the article **123**A.**853** secured to the panel **123**A.**700**. If a front rebate, such as **104.718** is provided the edge of the member **123**A.**853** will be inserted into the rebate **104.718**, and clamped therein by tightening the screw **123**A.**772**. The action of tightening the screw also has **126**A.**772** also has the effect of applying an equal and opposite clamping force between the panel **126**A.**700** and the lock member **126**A.**720**. These clamping forces and friction which results there from assists to prevent relative movement between the brackets **126**A.**771**, the article **126**A.**853** and the panel **126**A.**700**.

FIG. **124** illustrates the fully assembled system of FIGS. **119**, **119**A, **120**, **120**A, **123**, **123**A, in a wire frame view so that internal components can be viewed. In FIG. **124** the article is a bathroom vanity cabinet or unit or a cupboard which has the beam **124.780** built in or attached internally thereto to so as to be engaged with the brackets **124.771**, with one each side of the cabinet. In a bathroom situation the panel **124.700** can make up whole wall surface to which tiles or other wall finishing material can be attached. Alternatively the panel **124.700** can be of a size more closely approximating the size of the cabinet and this is then secured to the wall members and the cabinet mounted thereon. A particular advantage of the system illustrated in FIG. **124**, is that the brackets **124.771** do allow for considerable lateral adjustment of the cabinet **124.853** with respect to the brackets **124.771** and the panel **124.700**.

Some typical dimensions, for illustrative purposes only, of the support of FIGS. **119** and **119**A is that the height V is of

the order of 185 mm, while length T of member **119.720** is of the order of 40 mm and the length S of the arm **119.722** is approx 24 mm. The width of the arm **119.722**, into the peag of FIG. **119** is approx 25.5 mm. The width R of gap **119.943** is approx 21 mm, while the square beam **119.780** has a side length of approx 30 mm with the recess **119.322** has a width M of approx 45 mm and a height of approx 30 mm. As seen in FIG. **119**A the overall width X of the bracket is 29.5 mm while the internal width W is approx 25.5 mm.

FIG. **121** illustrates a system similar to that of FIGS. **119**, **120** and **120**A but differs there from by an additional laterally extending slot **121.795** in the support plate **121.770** for receiving a bottom protrusion **121.793** on a shaped or rebated beam **121.791**. The additional slot **121.795**, once a portion of the protrusion **121.793** has entered the slot **121.795**, assists to prevent movement of the beam **121.791** out of the opening **121.787** or the bracket **121.770**.

FIGS. **122** and **122**A, illustrate a system where a bracket similar to that of FIGS. **119** to **121** is provided but has with a reduced length of back wall **122.877** and differently shallower support plate **122.873**, which is of a rectangular shape, whereas previously a triangular shape was utilised. The system **123**A.**771** includes a grub screw **122**A.**977** and support plate **122.873**. FIGS. **127** to **130** illustrate a wire frame representation of a hanging support or bracket **127.873** which is similar to that illustrated in FIGS. **122** and **122**A with a recess **127.322** for receiving a beam on an article to be supported. A threaded hole **127.923** is located through the front edge and one side of the recess **127.322**. Another threaded hole **127.922** is provided through the middle or base side of the recess **127.322**. The holes **127.922** and **127.923** are threaded so that a bolt **127.222** can be inserted into hole **127.923** and another bolt **127.224**, whose axis of rotation is at 90 degrees to bolt **127.772**, can be inserted through the hole **127.224**. In use the bolts **127.772** and **127.224** will be generally horizontal and vertical respectively. The bolt **127.224**, in the example of the assembly of FIG. **125**, can be used to provide levelling or a specified angle where required. The bolt **127.224** however will need to have its adjustment performed before the bolt **127.772** is tightened for the final securing of the assembly and the components.

The bolts **129.224** and **129.772** can act as adjustment screws for both the vertical and horizontal position of the beam **129.780**. These adjustment screws use their distal ends **129.999** and **129.998**, which as illustrated in FIG. **130** can include pads **130.266** to create a greater surface area of contact between the beam **130.780** and the bolts **130.772** and **130.224**. If needed they can be covered with cushioning material. The bolts can maintain their vertical or horizontal positions through resistance or clamping forces, or alternatively a locking lug nut or any other suitable means such as a chemical lock can be used. The bolts or threaded screw adjustment means can be replaced with a piston or other means to allow vertical and horizontal adjustment of the beam.

FIG. **131** illustrates a perspective view of a cabinet being mounted to a panel **131.700** (of FIGS. **104** to **109**) by two hanging supports **131.873** of FIGS. **127** to **130** with vertical and horizontal beam adjustment. The hanging supports or brackets are mounted to the support panel as described above.

In FIG. **132** is an art screen **132.530** screen in a partially assembled state. The screen **132.530** is made up of two panels like **132.700** positioned back to back so that the rear vertical recesses are aligned. If desired they can be misaligned thereby preventing the ability to see through the screen **132.530**. A two mounting flanges **132.531**are formed on the ends of each panel **132.700**, so as to allow them to be easily assembled into slots on vertical supports **132.532**. They will stay locked together by the effect of gravity on the panels. This allows for easy disassembly when needed. Art work can then be mounted as needed onto the art screen **132.530** at any desired location using the brackets described above. Alternatively or additionally shelves can be also mounted thereto for the display of sculptures, statues, pottery and other freestanding art work and the like.

Illustrated in FIG. **133** is a stair case **133.550** made from a single side support panel **133.700** and stair treads **133.551** hung off the panel **133.700** by means of the brackets described above. While in FIGS. **134** and **135** is two side supported stair case formed from two panels **134.700** and stair treads **134.551** attached to both panels **134.700** by brackets **135.873** as described above. In this instance the stair treads **134.551** are in tension when assembled by the opposing brackets as illustrated in FIG. **135**. By the use of front surface rebates (such as **104.712**) the ends of the stair treads can be captured therein.

Illustrated in FIG. **136** is a dual hooked member **136.933** for screw or other attachment to a bracket, such as brackets of FIGS. **9**, **11**, **12**, **41** to **44** for example. The member **136.933** provides two hanging arms **136.722** and two member **136.720**, so that the member **136.933** can be passed into and secure a bracket into two adjacent apertures **104.704** on a sheet **104.700**.

An advantage of the panel **104.700** having an array of apertures and rear located vertical channels or recesses is that the multiple array of apertures allows rearrangement of furniture or articles in a relatively simple manner, and if electrical equipment is involved the rear vertically extending channels allow cable to be passed from the top or bottom or entry or exit at some intermediate point to be readily performed.

The brackets described above with respect to FIGS. **104** to **135** can be manufactured by casting, or a combination of casting and fabrication from sheet material, or just by fabrication of sheet material, with such joining methods as welding or bolting being used if not integrally formed, or from steel or appropriate composite materials.

Where the term disc flange has been used to describe the flanges on the end of a bracket support flange it does not restrict the shape of the flange to being circular as depicted in the drawings. The disc flange can be of any profile that is larger than the aperture in the bracket support and the width of the flange slots.

The pin that is part of the bracket support is depicted as being cylindrical throughout the drawings but this does not limit the profile of the pin to being circular. The pin can be of a variety of profiles from polygonal struts to irregular shape profiles. Similarly with respect to the disc flanges which are shown circular or cylindrical, other shape could also be used such as square or square prism, rectangular or rectangular prism, regular and irregular polygons or polygonal prism.

The above racking systems, support panels and hanging systems can be manufactured from any appropriate material such as: Plywood in any sheet form inclusive of custom veneering and Laminates of any thickness; Melamines of all kinds that come in sheet form and various thicknesses; Particle boards; Medium density fibreboard or CRAFTWOOD (registered trade mark); NEMA (registered trade mark) expanded PVC panels; Aluminium both in sheet or custom box sections; Steel; Galvanized Steel; Stainless steel; Solid timber; Plastics and polymers; composite materials; Decorative Laminates as per LAMINEX (Registered trade mark) catalogues; Acrylic; Fibreglass; Glass; Kevlar; Polymers; Masonite; Metal of any kind; Recycled material; ABS; PVC; Blown PVC polymer; expanded PVC panels; Masonry sheeting; Acoustic sheeting; Concrete; or Dibond materials.

The elasticity and damping created by the construction of the support flange and the slots, the shape and length of the bracket, the provision of a slot in the rear of the bracket, and the construction and physical properties of the bracket support and its pin, together provide a form of "suspension" system which can assist in the protection of equipment to be stored on such a racking system. It will be readily understood that the dimensions and material properties of the materials used can be adjusted as required to deliver a desired level of elasticity and damping.

TABLE 1

Material	Product	Tongue size	Length	Width	Height	Starting Height	6.4 KG	End Height	Deflection
MDF	Long Straight Bracket	200	1085	25	100	1161	1154	1161	7
	M Straight Bracket	200	950	25	100	1150	1147	1150	3
	Large Kayak Bracket	200	755	25	615	689	686	689	3
	Surf Sid Bracket	50	700	25	500	910	900	910	2
	Fishing Bracket	203	812	25	156	835	920	935	15
	8 Straight Bracket	73	900	25	80	1335	1130	1335	5
	8 Straight w Dowel	203	900	25	80	1367	1369.6	1367	7.5
Name	Fishing Bracket	56	890	25	155	967	943	967	24
	Straight Bracket	120	900	25	100	1019	1010	1019	9
	Large Kayak Bracket	120	730-840	25	100	561	551	581	10
CD Plywood	Long Straight Bracket	200	1085	25	100	764	753	764	11
	Straight Bracket	200	950	25	100	752	743	752	9
	Large Kayak Bracket	200	755	25	815	750	773	780	7

Material	Product	13.9 KG	End Height	Deflection	18 KG	End Height	Deflection	25 KG	End Height	Deflection
MDF	Long Straight Bracket	1134	1161	27	1118	1161	43	1107	1161	54
	M Straight Bracket	1136	1150	14	1122	1150	28	1114	1150	36
	Large Kayak Bracket	677	689	12	675	689	14	862	689	27
	Surf Sid Bracket	901	910	9	908	910	4	904.6	910	5.5
	Fishing Bracket	902	935	33	902	935	33	891	935	44
	8 Straight Bracket	1316	1306	19	1304	1335	31	1292	1335	43
	8 Straight w Dowel	1346.6	1367	22	1336	1367	31	1322	1367	46
Name	Fishing Bracket	927	967	40	919	967	48	891	967	76
	Straight Bracket	972	1019	47	986	1019	54	949	1019	70
	Large Kayak Bracket	533	561	20	527	581	34	619	661	42
CD Plywood	Long Straight Bracket	741	763	23	724	761	40	700	760	61
	Straight Bracket	730	751	22	729	751	23	700	748	52
	Large Kayak Bracket	758	780	24	748	778	32	734	775	48

TABLE 2

Material	Product	Tongue size	Length	Width	Height	Starting Height	5.4 KG	End Height	Deflection	13.8 KG
MDF	Long Straight Bracket	200	1085	25	100	1062	1052	1062	10	1045
	Straight Bracket	200	960	25	100	1052	1048	1052	6	1041
	Large Kayak Bracket	200	755	25	615	1015	1212	1015	3	1008
	Surf Sid Bracket	50	700	25	300	889	686	689	3	684
	Fishing Bracket	203	812	25	156	1089	1025	1089	64	1082
	Straight Bracket	73	910	25	60	1340	1333	1340	7	1326
	Straight w Dowel	203	910	25	60	1360	1356.5	1360	3.5	1348
Name	Fishing Bracket	88	890	25	155	867	951	967	16	937
	Straight Bracket	120	900	25	100	1019	1009	1019	10	992
	Large Kayak Bracket	120	730-840	25	100	561	552	581	9	540
CD Plywood	Long Straight Bracket	200	1085	25	100	1084	1059	1084	5	1051
	Straight Bracket	200	950	25	100	1054	1049	1054	5	1045
	Large Kayak Bracket	200	755	25	615	799	796	799	3	793

Material	Product	End Height	Deflection	18 KG	End Height	Deflection	25 KG	End Height	Deflection
MDF	Long Straight Bracket	1062	17	1039	1062	23	1032	1062	30

TABLE 2-continued

	Straight Bracket	1052	11	1038	1052	16	1031	1062	21
	Large Kayak Bracket	1015	7	1008	1015	9	1002	1015	13
	Surf Sid Bracket	689	6	683	689	6	681	689	8
	Fishing Bracket	1089	7	1080	1089	9	1077	1089	12
	Straight Bracket	1340	14	1322	1340	16	1310	1340	24
	Straight w Dowel	1360	12	1344	1360	16	1337	1360	23
Name	Fishing Bracket	967	30	927	967	40	901	967	68
	Straight Bracket	1019	27	977	1019	42	955	1019	64
	Large Kayak Bracket	581	21	533	561	20	518	581	43
CD Plywood	Long Straight Bracket	1064	19	1046	1064	18	1040	1064	24
	Straight Bracket	1054	9	1040	1054	14	1037	1054	17
	Large Kayak Bracket	799	6	790	799	9	784	799	15

Table one represents the data produced from a 100 mm drop test of a masses 5.4 kg, 13.8 kg, 18 kg and 25 kg onto the end of a bracket similar to that of FIG. **42**, in twin support flanges of approximately 19 mm thick with a slot shape as illustrated in FIG. **1**, with a measurement of the elasticity and damping being the amount of deflection the racking system generated.

Whereas in table two there is represented the data from static tests using the same masses and measuring deflection by applying the masses for a period of three minutes.

Each of the brackets yielded sufficient elasticity, suspension or damping qualities.

The above described rack systems, bracket systems and panel systems can be used with and to support, in addition to the items mentioned above, a variety of other things in commercial, industrial and domestic environments, for example: surf & sport storage such as SUPS, short boards, long boards, snowboards, skateboards, skis, stocks, water-skis, wakeboards, body boards, surf life saving rescue boards, canoes/kayaks, boats, dinghies, rubber—zodiacs, catamarans, outriggers, fishing/crab nets, fishing rods, fishing basket, paddles, oars, bikes, scooters, scuba tanks, beach umbrellas, gym equipment, footballs, baseball bats, basketball/ring hoop, roller blades, roller skates, helmets, goggles/face mask/snorkel, flippers, wetsuits, toys and marine equipment; or in building applications such as cabinets of all sorts, vanities, electrical switch boards, school work shops, office joinery, bench tops, hospital furniture, kit homes, project homes, demountable buildings, mining, tool sheds, garages, general hosing, hotels, pubs and clubs, flood prone areas, surf clubs, sporting clubs, lockers; or in the home or commercial premises for storing: linen, rugs, curtain rods, curtains, rolls of fabric, canvas, laundry basket, clothes lines, pegs, window frames, pc/hard-drive/monitor, flat screen TVs, lap tops, luggage, suitcases/briefcases, suit bags, handbags; or hardware, garden tools, equipment & automotive: power tools, electrical cords, ropes, two ropes, cables, soil (bags), potting mix, timber, nails, vice, tool kits, block & tackle, shovels/spades, paint cans, paint brushes, building materials, wub, garden hose, hose reel, inner tubes, tyres, lawn mower, whipper snipper, chain saw, barbecues, gas cylinder, garbage bins, step ladder, locks, outboard motors, car seats/mats/head rests, wind screens, roof racks, bike racks, packaging equipment, tents; or kitchen equipment: kitchen equipment such as kitchen appliances, saucepans, glass ware, wine racks, crockery, cutlery, fruit & veg, picnic baskets, esky; or other—electronics, clothing, medical items such as speakers, records, camera equipment, DVDs, books, magazines, jewellery, make up, hangers, parkers, gumboots, shoes, stationary, artwork, sculpture, craft supplies, candles, mannequins, scales, birdcages, pet supplies, golf bags/clubs, hospital sundries, surgical equipment, medical supplies, optical supplies, keys.

Where ever it is used, the word "comprising" is to be understood in its "open" sense, that is, in the sense of "including", and thus not limited to its "closed" sense, that is the sense of "consisting only of". A corresponding meaning is to be attributed to the corresponding words "comprise", "comprised" and "comprises" where they appear.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text. All of these different combinations constitute various alternative aspects of the invention.

While particular embodiments of this invention have been described, it will be evident to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments and examples are therefore to be considered in all respects as illustrative and not restrictive, and all modifications which would be obvious to those skilled in the art are therefore intended to be embraced therein.

The invention claimed is:

1. A support panel having a front face and a rear face and a plurality of apertures extending through said support panel between said front face and said rear face; said rear face including a respective recess adjacent to a respective one of said plurality of apertures, said respective recess having a base surface which in side view is located between said front face and said rear face, wherein said base surface of said respective recess is bounded by at least one sidewall extending inward from said rear face, and wherein said base surface of said respective recess intersects with a wall that extends forward toward said front face and that defines said respective one of said plurality of apertures.

2. A support panel as claimed in claim **1**, wherein:

said respective recess is located relative to said respective one of said plurality of apertures in one of the following locations: on one side of said respective one of said plurality of apertures; on two sides of said respective one of said plurality of apertures; on opposed sides of said respective one of said plurality of apertures; in a line on opposed sides of said respective one of said plurality of apertures; fully surrounds said respective one of said plurality of apertures; in a circle around said respective one of said plurality of apertures.

3. A support panel as claimed in claim **1**, wherein:

said respective recess is in the form of a rebate and is formed as a channel formation having opposed side walls that extend from the base surface.

4. A support panel as claimed in claim 1, wherein:
said plurality of apertures are provided in the form an array of rows and columns, and wherein said respective recess is a rebated channel having opposed side walls, wherein said rebated channel interconnects aligned one of said plurality of apertures.

5. A support system comprising:
a support panel having a front face and a rear face and a plurality of apertures extending through said support panel between said front face and said rear face, said rear face including a respective recess adjacent to a respective one of said plurality of apertures, said respective recess having a base surface which in side view is located between said front face and said rear face, wherein said base surface of said respective recess is bounded by at least one sidewall extending inward from said rear face, and wherein said base surface of said respective recess intersects with a wall that extends forward toward said front face and that defines said respective one of said plurality of apertures, wherein said support panel is configured to be secured to a plate member; and
a support member having a body and at least one support hook which has a first portion to engage an edge of a given one of said plurality of apertures, said body extending away from said first portion, said support hook having a second portion which extends from said first portion so as to form a gap or slot between said body and said second portion to receive a part of said support panel adjacent said given one of said plurality of apertures, said second portion in use being adapted to be generally parallel to a rear surface of said support panel, wherein said second portion of said support hook is configured to pass through said given one of said plurality of apertures such that when said first portion has been positioned against a wall of said given one of said plurality of apertures said second portion is located adjacent a rear surface of said support panel and adjacent said plate member;
wherein said given one of said plurality of apertures of said support panel defines an opening that is completely surrounded by at least one inward facing wall and the first portion and second portion of the hook are configured such that both the first and second portions of the hook pass through the opening of said given one of said plurality of apertures in use and the second portion of the hook engages the rear surface of the support panel adjacent said given one of said plurality of apertures in use.

6. A support system as claimed in claim 5, wherein:
said base surface is spaced from said plate member and provides a location into which said second portion is inserted in use.

7. A support system as claimed in claim 6, wherein:
said first portion is of a length from said body to said second portion so that when a rear surface of said body is against the front surface of said support panel then said second portion will be able to enter said respective recess.

8. A support system as claimed in claim 7, wherein:
said first portion extends generally perpendicularly from said body of said support member and said second portion extends generally perpendicularly from said first portion.

9. A support system as claimed in claim 5, wherein:
said respective recess is located relative to said respective one of said plurality of apertures in one of the following locations: on one side of said respective one of said plurality of apertures; on two sides of said respective one of said plurality of apertures; on opposed sides of said respective one of said plurality of apertures; in a line on opposed sides of said respective one of said plurality of apertures; fully surrounds said respective one of said plurality of apertures; in a circle around said respective one of said plurality of apertures.

10. A support system as claimed in claim 5, wherein:
said respective recess is in the form of a rebate and is formed as a channel formation having opposed side walls and a base.

11. A support system as claimed in claim 5, wherein:
said support member includes at least one element selected from the group consisting of
(i) said at least one support hook being two support hooks,
(ii) said at least one support hook being two support hooks configured to respectively pass into respective ones of said plurality of apertures in said support panel,
(iii) said at least one support hook being a single support hook and there is also present a stabilizing projection, and
(iv) said at least one support hook being a single support hook and there is also present a stabilizing projection, wherein said single support hook and said stabilizing projection are configured to respectively pass into respective ones of said plurality of apertures in said support panel.

12. A support system as claimed in claim 5, wherein:
said support member includes a recess to receive one of the following: a structural member; a beam; a bracket; a part of or attached to one of a piece of furniture, a cabinet, a vanity cabinet, a cupboard, a shelf, a dressing table, a seat, a chest of drawers, a chair, a work bench, a building element, a stair tread, a beam, an art work.

13. A support system as claimed in claim 12, wherein:
said support member includes at least one element selected from the group consisting of
(i) an element configured to secure said structural member onto said support members,
(ii) an element configured to secure an article attached to the structural member with respect to said support panel, and
(iii) an element configured to secure said support member to said support panel.

14. A support system as claimed in claim 12, wherein:
said support member further comprises at least one element selected from the group consisting of
(i) an element configured to move or secure said structural member in a horizontal direction,
(ii) an element configured to move or secure said structural member in a vertical direction,
(iii) an element configured to move or secure said structural member in both a vertical direction or a horizontal direction, and
(iv) an element configured to lock position of said structural member relative to said support member.

15. A support system as claimed in claim 5, wherein:
said support member includes two support hooks which move towards each other so that said support hooks pass through respective ones of said plurality of apertures of said support panel.

16. A support system as claimed in claim 15, wherein:
said support member further comprises at least one element selected from the group consisting of
(i) a securing member passing through said two support hooks to move said support hooks relative to each other,

(ii) said two support hooks comprise a first support hook provided on a first portion being insertable into a second portion on which is provided a second support hook, and wherein said first and second portions are adapted to move with respect to each other,

(iii) said two support hooks are configured to pivot with respect to one another;

(iv) a tubular portion to receive a structural member,

(v) a support to receive a bracket, and

(vi) at least one support hook including outwardly radiused or curved regions.

17. A support system as claimed in claim **5**, wherein:

said at least one support hook engages said respective recess or said respective one of said plurality of apertures to thereby resist twisting forces applied to said support member.

18. A support system as claimed in claim **17**, wherein:

said first portion of said support hook engages sides of said respective one of said plurality of apertures to provide said support member with resistance against twisting around an axis generally parallel to said second portion.

19. A support system as claimed in claim **5**, wherein:

said respective recess is formed by a rebate which extends between at least two apertures.

20. A support system as claimed in claim **5**, wherein:

said given one of said plurality of apertures and said support hook are respectively dimensioned so that said support hook enters said given one of said plurality of apertures in a perpendicular direction relative to said front surface of said support panel.

21. A support system as claimed in claim **5**, wherein:

said plate member comprise an element selected from the group consisting of

(i) a rear panel or plate attached to a rear surface of said support panel,

(ii) a wall to which a rear surface of said support panel is attached, and

(iii) a wall member to which a rear surface of said support panel is attached.

22. A support system as claimed in claim **5**, wherein:

said support member is a bracket.

23. A support system comprising:

a support panel having a front face and a rear face and at least one aperture extending through said support panel between said front face and said rear face, said rear face including a recess adjacent to said aperture, said recess having a base surface which in side view is located between said front face and said rear face, wherein said base surface of said recess is bounded by at least one sidewall extending inward from said rear face, wherein said base surface of said recess intersects with a wall that extends forward toward said front face and that defines said aperture, and wherein said support panel is configured to be secured to a plate member and said at least one aperture communicating from a front surface to a rear surface of said support panel; and

a support member having a body and at least one support hook which has a first portion to engage an edge of said at least one aperture, said body extending away from said first portion, said support hook having a second portion which extends from said first portion so as to form a gap or slot between said body and said second portion to receive a part of said support panel adjacent said at least one aperture, said second portion in use being adapted to be generally parallel to a rear surface of said support panel, wherein said second portion of said support hook is configured to pass through said aperture such that when said first portion has been positioned against a wall of said aperture said second portion is located adjacent a rear surface of said support panel and adjacent said plate member;

wherein the aperture of said support panel defines an opening that is completely surrounded by at least one inward facing wall, wherein the first portion and second portion of the hook are configured such that both the first and second portions of the hook pass through the opening of the aperture in use, and wherein the second portion of the hook engages the rear surface of the support panel adjacent the aperture in use; and

wherein said recess is located relative to said aperture in one of the following locations: on one side of said aperture; on two sides of said aperture; on opposed sides of said aperture; in a line on opposed sides of said aperture; fully surrounds said aperture; in a circle around said aperture.

24. A support system comprising:

a support panel having a front face and a rear face and at least one aperture extending through said support panel between said front face and said rear face, said rear face including a recess adjacent to said aperture, said recess having a base surface which in side view is located between said front face and said rear face, wherein said base surface of said recess is bounded by at least one sidewall extending inward from said rear face, wherein said base surface of said recess intersects with a wall that extends forward toward said front face and that defines said aperture, and wherein aid support panel is configured being adapted to be secured to a plate member and said at least one aperture communicating from a front surface to a rear surface of said support panel;

a support member having a body and at least one support hook which has a first portion to engage an edge of said at least one aperture, said body extending away from said first portion, said support hook having a second portion which extends from said first portion so as to form a gap or slot between said body and said second portion to receive a part of said support panel adjacent said at least one aperture, said second portion in use being adapted to be generally parallel to a rear surface of said support panel, wherein said second portion of said support hook is configured to pass through said aperture such that when said first portion has been positioned against a wall of said aperture said second portion is located adjacent a rear surface of said support panel and adjacent said plate member;

wherein the aperture of said support panel defines an opening that is completely surrounded by at least one inward facing wall, wherein the first portion and second portion of the hook are configured such that both the first and second portions of the hook pass through the opening of the aperture in use, wherein the second portion of the hook engages the rear surface of the support panel adjacent the aperture in use, and wherein said first portion of said support hook engages sides of said at least one aperture to provide said support member with resistance against twisting around an axis generally parallel to said second portion.

25. A support system comprising:

a support panel having a front face and a rear face and at least one aperture extending through said support panel between said front face and said rear face, said rear face including a recess adjacent to said aperture, said recess having a base surface which in side view is located between said front face and said rear face, wherein said

base surface of said recess is bounded by at least one sidewall extending inward from said rear face, and wherein said base surface of said recess intersects with a wall that extends forward toward said front face and that defines said aperture, wherein a support panel having at least one aperture through said panel, wherein said support panel is configured to be secured to a plate member and said at least one aperture communicating from a front surface to a rear surface of said support panel;

a support member having a body and at least one support hook which has a first portion to engage an edge of said at least one aperture, said body extending away from said first portion, said support hook having a second portion which extends from said first portion so as to form a gap or slot between said body and said second portion to receive a part of said support panel adjacent said at least one aperture, said second portion in use being adapted to be generally parallel to a rear surface of said support panel, wherein said second portion of said support hook is configured to pass through said aperture such that when said first portion has been positioned against a wall of said aperture said second portion is located adjacent a rear surface of said support panel and adjacent said plate member;

wherein the aperture of said support panel defines an opening that is completely surrounded by at least one inward facing wall, wherein the first portion and second portion of the hook are configured such that both the first and second portions of the hook pass through the opening of the aperture in use, wherein the second portion of the hook engages the rear surface of the support panel adjacent the aperture in use, and wherein said at least one aperture and said support hook are respectively dimensioned so that said support hook enters said at least one aperture in a perpendicular direction relative to said front surface of said support panel.

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